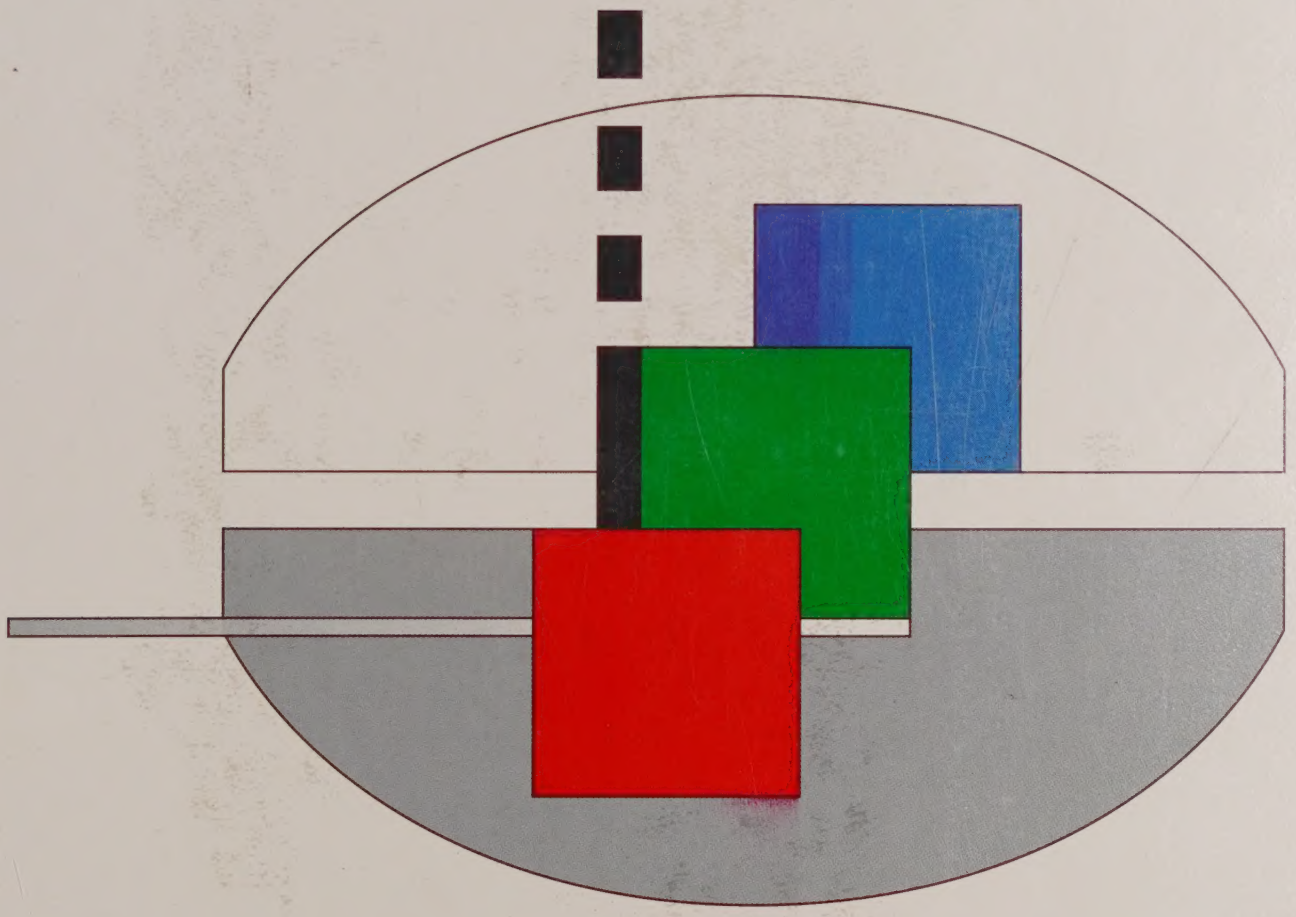
Instruction Manual



Philips TV Test Equipment

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VITS Generator & Inserter
PM 5655M

Instruction Manual

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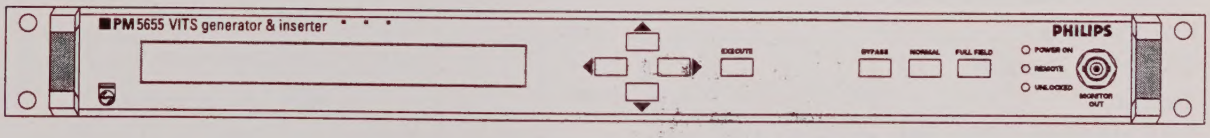

Philips
TV Test
Equipment

PHILIPS

Important

In correspondence concerning this instrument, please quote the full type and KU. number (serial number) as shown on the identification plate on the rear of the instrument.

Training

Courses of technical training on this, and other current PTV equipment are available either on a pre-planned basis, or to suit individual requirements.

These courses are held in English.

For details of location, time and duration of pre-planned courses, or the possibilities that exist for individually planned courses, please complete the form on the next page and return it to the Philips Customer Support Organization in your country.

Or contact:

Philips TV Test Equipment A/S
Kornmarksvej 21
DK - 2605 Brøndby
Denmark
Tel.: +45 3288 5911 - Fax: +45 4343 2390

Fault analysis

In the event of instrument failure, please complete the "Fault Analysis report" situated in Chapter - Service hints of this manual. After completion, please send it to the Philips Customer Support Organization in your country.

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Request for Training

Recent advances in equipment design and our commitment to the use of leading edge technology has placed increasing demands on servicing personnel world-wide. While we make every effort to ensure that our manuals reflect these advances (at the same time remaining service oriented), the need for effective and regular training has become more and more necessary.
Tailor-made courses of instruction on current PTV instruments are therefore being made available to complement the information contained in our manuals. Participation will inevitably lead to reduced down-time and repair costs.
If you are interested in our training program or just require information, please complete the information sheet below, and send it to the Philips Customer Support Organization in your country who will contact you and provide more detailed information for your consideration.

We require information only : ☐

Company Name : _____

Address : _____

_____

_____

We like training on the following instruments :

PM _____ PM _____ PM _____ PM _____

PM _____ PM _____ PM _____ PM _____

Type of course required :

Systems/Applications ☐

Servicing/Faultfinding ☐

Other (please specify below) ☐

_____

Number of participants (max. 12): ☐

Time available (days): ☐

Location :

On my own premises ☐

At Philips Customer Support ☐

In Copenhagen ☐

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GUARANTEE STATEMENT

The Philips guarantee is in addition to all rights which buyer may have against his supplier under the sales agreement the buyer and the supplier and according to local legislation.

Philips guarantees this product to be free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment. This guarantee does not cover possible required re-calibration and/or standard maintenance actions. This guarantee extends only to the original purchaser and does not apply to fuses, batteries or to any product or part thereof that has been misused, altered or has been subjected to abnormal conditions of operation and handling.

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GENERAL INFORMATION

1. Safety

Read this chapter carefully before installation and use of the instrument.

1.1 Introduction

The instrument described in this manual is designed to be used by properly-trained personnel only. Adjustment, maintenance and repair of the exposed equipment shall be carried out only by qualified personnel who are aware of hazards involved.

1.2 Safety Precautions

For the correct and safe use of the instrument, it is essential that both operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual. Specific warning and caution statements, where applicable, are found throughout this manual. Warning and caution statements and/or symbols are marked on the instrument where necessary.

1.3 Caution and Warning Statements

Caution
Used to indicate correct operation or maintenance in order to prevent damage to, or destruction of equipment or other property.

Warning
Used to indicate a potentional hazard that requires correct procedures or practices in order to prevent personal injury.

1.4 Impaired Safety Protection

1.4.1 Technical Specifications

This manual provides technical information important for safe operation of the equipment.

Please refer to the Chapter **Product Data** for information regarding technical specifications and the Chapter **Installation and Operating Instructions** regarding instructions for use.

Technical assistance may be obtained from your local Philips customer support organization or from:

Philips TV Test Equipment A/S
Kornmarksvej 21
DK-2605 Brøndby
Denmark
Tel. : +45 3288 5911
Fax : +45 4343 2390

1.4.2 Equipment Ratings

The instrument can be used with a mains voltage supply of:

Voltage:
100VAC, 120VAC, 220VAC, or 240VAC
(+10% / -15%, max. 250VAC)

Frequency:
48 - 65Hz

The power consumption:
does not exceed 60 VA.

The instrument is designed for the following environmental conditions:

- Indoor use
- Altitudes up to 2000m
- Temperatures between 5°C and 45°C
- Maximum relative humidity of 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C

The instrument is equipped with a number of input and output terminals as described in the Chapter **Product Data**.

The terminals are protected from becoming hazardous live by means of basic insulation and protective screening.

Whenever it is likely that safe operation is impaired, the instrument must be made inoperative and secured against unintended operation. The appropriate servicing authority must be informed.

For example, safety is likely to be impaired if the instrument fails to perform the intended measurements or shows visible damage.

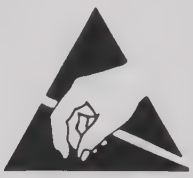
WARNING: Protection provided by the equipment may be impaired, if the equipment is used in a manner not specified by this manual.

1.5 Electrostatic Sensitive Devices

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).

Careless handling during repair can reduce lifetime drastically.

When repairing, make sure that you are connected to the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.



ATTENTION

1.6 Symbols

Symbol:	Color:	Explanation:
	Red	High voltage terminal: a terminal at which a voltage, with respect to another terminal or parts exists or may be adjusted to 1000V or more. (High voltage≥1000V).
	Black/Yellow	Live par shock risk of electric shock.
	Black/Yellow	To preserve the instrument from damage the operator must refer to an explanation in the instruction manual.
~	Black	Alternating current (*placed on the indetification plate*)
	White/Black	On (supply - *mains switch*)
	White/Black	Off (supply - *mains switch*)

2. Introduction and Application

2.1 General Information

The PM 5655M VITS generator & inserter is a self-contained instrument designed to generate VITS (*Vertical Insertion Test Signals*) and insert these digitally generated signals into the program video signal together with externally applied signals.

A number of freely assignable VITS groups are available, which enables a very quick switching between different VITS settings.

The normal insertion interval covers lines 10-30 in field 1 and field 2, but a special VITS group also i ncludes any TV line between line 10 and 252. The PM 5655M safeguards against "spillover" from previously inserted VITS/data because the erasure interval is wider than the insertion interval.

The PM 5655M provides more than 30 test signals of NTC7, FCC, ITU-R and other specifications. This set also includes commonly used test lines, e.g. SinX/X, multipulse, sweep signals, and all of the Ghost reference signals specified for the 525 lines TV system. All these digitally generated test signals and inputs from up to four AC-coupled and clamped signals can be inserted into the vertical blanking interval.

For easy identification of the video source, a 24 character text string can be inserted into the vertical interval. Text can also be added to the internal full-field substitution signals/patterns; a total of 16 pages can be programmed.

Transparency and continuity are main concerns in program distribution. The PM 5655M is designed to eliminating virtually all distortions and transients during operation; alien signals are bypassed transparently and thus cause minimal distortion.

The loss of program continuity is handled by the PM 5655M, which can be programmed to perform three functions:

- ✦ Relay bypass
- ✦ Active bypass
- ✦ Substitution of the program signal

The relay bypass function with a delay-matched path automatically switches the incoming video signal directly to the output if the bypass function is activated. This function may be activated manually or automatically due to power failures or (if programmed) poor signal quality.

The active bypass guides the signal through the PM 5655M without clamping or processing, providing optimal transparency in the case of very noisy signals or non-standard signals.

Instead of the program signal, one of the internal test patterns or signals - or even an external stand-by signal - can be used until the program input is restored. The PM 5655M can also add user-programmed text to the full-field stand-by signal (internally generated). The substitution patterns include both SMPTE and EIA color bars and complex test cards such as the PHILIPS pattern, in both 4:3 and 16:9 widescreen format.

If the program signal is disappearing, the program path first goes into transparent mode with no clamping and insertion. Next, an operator programmable delay determines the length time before substitution takes place. At the return of the program signal, a programmable delay also determines the time from the acceptance of a valid program signal until it, with VITS, is available at the output.

If signal quality is poor, the PM 5655M can also replace the program sync (and burst).

For test purposes, the program signal can be replaced with a full-field test signal or even a complete test pattern.

Besides the main "PROGRAM OUT" output a number of monitoring outputs are available:
- "TEST OUT", which is directly connected to the program out amplifier.
- "MONITOR OUT" (front and rear) monitors the output signal just before of the program output amplifier and bypass relay.

A separate "TEST SIGNAL" output is always available for simultaneous testing of video paths, etc. This output switches to the stand-by signal if substitution is necessary.

The PM 5655M is operated by means of menu-controlling buttons and an LCD display. Built-in security measures prevent unauthorized access to programming or changes to other vital operational functions.

Built-in remote control of the basic functions is provided by means of ground closure TTL control. Functions provided include:
- Normal/Bypass/Full-field
- Flags for Normal/Bypass/Full-field
- Flag for unlocked
- Selection of VITS groups
- Substitution modes
- Front plate disable

A number of standard assignments are pre-programmed, but for most controls the user may configure the pins of the connector to suit the application and installed options.

2.2 Test Signals

The signal generator employs high-precision digital-to-analog conversion to ensure optimum signal accuracy and stability. The signal generator uses two 12-bit digital-to-analog converters (DACs) to generate the composite NTSC signal digitally, without the use of analog modulators. The two channel solution ensures the optimum signal quality.

The PM 5655M provides a full range of test signals:
- NTC7 composite and combination
- FCC composite and multiburst
- VIRS signal
- FCC color bar
- BTA, Philips, and Korean Ghost signals
- Multiburst, 100% and 60%
- Staircase, luminance and modulated
- SinX/X, 100% and 70%
- Red signal, 75%
- 0, 7.5, 10, 50, 90, and 100IRE luminance levels
- Multipulse, 100% and 70%
- Line sweep, 5MHz
- 2T reflection pulse
- Pulse & bar signal
- 60Hz and 250kHz squarewaves
- Ramp, luminance and modulated
- Eyetest lines

The generator also supports the APL (*Average Picture Level*) and Bouncing facilities.

The range of test patterns available includes:
- SMPTE and EIA bars
- Bars over Red
- TTS pattern (*Transmission Test Signal*)
- Matrix pattern
- PHILIPS pattern, 4:3 and 16:9 format
- Eyetest pattern

2.3 Applications

The PM 5655M serves as a source for insertion of test signals for evaluating the video performance of a transmission path, and for insertion data signals.

External and internal data signals may be inserted to facilitate TVservices such as:
- Teletext
- Captions for the hearing-impaired

Typical application areas are:

- Broadcast main terminals
- Cable head-ends
- TV transmitters
- Satellite connections

Automatic substitution of the program signal safeguards the transmitter against accidents, but may also be used to convey a message in readable text together with the stand-by signal.

2.4 Options

2.4.1 PM 8551: Remote Interface, RS232 or IEEE-488

The intelligent remote control options enable control of all instrument functions and also make available all status information.

2.4.2 PM 8554: Linear Video Keyer

The video keyer enables insertion of a station logo, which very often is permanently inserted in a corner of the active picture area.

The key function requires either a key signal and a video fill signal from an external source or an internal logo. This internal logo according to customer specification can be preprogrammed.

The video keyer can be disabled via the front plate or by remote control.

NOTE: The video keyer cannot be used at the same time as the video processor (PM 8555).

2.4.3 PM 8555: Video Processor

The video processor module restores the program signal before transmission, e.g. limits video level, controls the video level automatically or manually, etc.

Restoration of video level, either manually or automatically by measurement of white on a VITS signal, e.g. NTC7 signals, FCC composite signals, or other signals.

A white clipper limits the luminance amplitude to nominal 714mV video. Limiting occurs after video regulation. The level of the white clipper is adjustable (internally).

Loss of reference will cause the regulation to be sustained until the reference signal appears again. Alternatively the video signal may be exposed to a predetermined amplification.

Sync can be automatic gain controlled together with the video content or substituted by an internally generated sync pulse. This new sync is inserted with a tighter timing tolerance than with the standard PM 5655M. Burst may also be replaced.

2.4.4 PM 8557: Detector for Non-synchronous External Input

This option ensures that the applied EXT1, EXT2, EXT3, and EXT4 signals are gated into the program signal only if they are in phase and locked to the program signal.

The external signals must carry a sync for them to be detected.

When signals are non-synchronous, the corresponding lines are put into PASS state.

3. Product Data

3.1 Safety Characteristics

This instrument has been designed and tested in accordance with the safety Class I requirements of the IEC Publication 348 (Safety Requirements for Electrical Measuring Apparatus), and has been supplied in a safe condition. This manual contains information and warnings which must be followed during operation and service to ensure safety and to retain the apparatus in a safe condition.

3.2 Performance Characteristics

Characteristics expressed in numerical values with stated tolerances are guaranteed tolerances, when the instrument is calibrated at 20-30°C and after 20min. warm-up. Specified non-tolerance numerical data indicate typical values at nominal ambient temperature (25°C) and reflects an average performance.

3.3 Versions

Available in NTSC-M and PAL G/I version.

3.3.1 Options

PM 8551/20 : Remote interface, RS232
PM 8551/30 : Remote interface, IEEE-488
PM 8552 : Slide rail, rack mounting kit
PM 8554 : Linear video keyer
PM 8555 : Video processor
PM 8557 : Detector for non-synchronous external inputs

3.4 Main Functions

3.4.1 PROGRAM IN

Looped-through in bypass mode.
Input impedance:
75Ω
Return loss:
>36dB to 5MHz
Maximum DC:
±2V

3.4.2 Program Channel

Gain:
Unity ±1%
Frequency response:
±1% to 6MHz, +1, -5% from 6-10MHz.
Chrominance to luminance gain:
<0.5%
Chrominance to luminance delay:
≤2ns
Group delay:
≤2ns to 5MHz
Diff. phase:
≤0.15°
Diff. gain:
≤0.2%
50Hz tilt:
≤0.5%
15kHz tilt:
≤0.25%
DC matching program video to inserted signal:
±3mV
Phase matching program video to inserted signal:
±1° at subcarrier (@ S/N > 45dB)
Switching transients:
≤2mV measured in 10MHz bandwidth
Crosstalk into main channel:
≥60dB up to 6MHz
Random HF noise:
<-70dB$_{RMS}$ unweighted in 5MHz bandwidth

3.4.3 Program Out

Impedance:
75Ω ±0.5Ω
Return loss:
≥36dB to 5MHz
DC output level:
0V ±20mV
Delay difference between NORMAL and BYPASS:
<1° at subc.

3.4.4 Insertion Range

Internal and external signals are inserted after erasure of the line(s) has taken place.

8 groups are available:
Group 1-4 : Normal
Group 5 : Programmable in 4-field sequence
Group 6-7 : Normal
Group 8 : All TV-lines, except field pulses

Insertion and erasure range:
TV-lines 10-30 in field 1 & 2 (Group 1-7).
TV-lines 10-262 in field 1 & 2 (Group 8).

Signals available as VITS:
Refer to Appendix A1.
Insertion of only full lines, i.e. line 21 field 2 is inserted as a full line.

Erasure interval:
starts 8.8µs ±0.15µs after leading sync edge
stops 1.0µs ±0.15µs before leading sync edge

Insertion interval (appropriate for external signals):
Standard insertion range (Std):
starts 9.2µs ±0.15µs after leading sync edge
stops 1.4µs ±0.15µs before leading sync edge
Wide insertion range (Wide):
same as Erasure interval

3.5 External Inputs

AC-coupled and clamped.

3.5.1 EXT 1

Impedance:
Looped-through
Maximum DC:
±2V

3.5.2 EXT 2 to 4

Impedance:
75Ω
Return loss:
>36dB to 6MHz
Maximum DC:
±2V

3.5.3 Common Specification for External Inputs

Gain:
Unity ±1%
Frequency response:
±1% to 6MHz, +1, -5% from 6-10MHz
Chrominance to luminance gain:
<0.5%
Chrominance to luminance delay:
≤5ns.
Group delay:
≤5ns to 5MHz
Diff. phase:
≤0.2°
Diff. gain:
≤0.2%
50Hz & 25kHz tilt:
≤0.5%
DC matching program video to inserted signal:
±3mV.
Switching transients:
≤2mV
Crosstalk into main channel:
>60dB down up to 6MHz.

Crosstalk from any channel into any other:
>60dB up to 6MHz
S/N ratio:
<-70dB$_{RMS}$ unweighted in 5MHz bandwidth
Hum rejection, measured right after burst:
>50dB
Timing drift, program to external channel:
<±2°

3.6 Test Signal Generator

Luminance white amplitude:
100IRE ±0.7IRE
Frequency response:
±1% to 5MHz
Chrominance to luminance gain:
±0.5%
Chrominance to luminance delay:
≤5ns
Group delay:
≤5ns up to 5MHz.
Diff. gain:
≤0.3%
Diff. phase:
≤0.3°
Chrominance/luminance intermodulation:
<0.25%
Static non. lin.:
<0.5%
Pulse to bar ratio:
100 ±1%
K-factor$_{2T}$:
<0.3%
50Hz tilt:
≤0.5%
15 kHz tilt:
≤ 0.25%
S/N ratio on test signal output:
≥75dB unweighted in 5MHz bandwidth
Spurious signals:
below -60dB referred to 1V for frequencies up to 5.5MHz,
below -55dB referred to 1V for frequencies from 5.5MHz and upwards.

General rise time for luminance and chrominance, except explicitly mentioned under signal description, see paragraph 3.10 "Specifications for Test Signals"
Luminance rise time:
200ns ±10ns
Chrominance rise time:
275ns ±15ns

Sync parameters according to RS170A and SMPTE 170M EG27:
Burst amplitude:
40IRE ±0.5IRE
Burst rise time:
300ns ±50ns
Burst position:
5.3µs (19cycles ±10° from sync reference)
Burst duration:
2.5µs ±0.1µs (9cycles ±1cycle)
Setup:
7.5IRE ±0.5IRE
Sync amplitude:
40IRE ±0.5IRE
Sync rise time:
140ns ±10ns
Front porch duration:
1.5µs ±0.05µs
Horizontal sync duration:
4.7µs ±0.1µs
Vertical serration duration:
4.7µs ±0.1µs
Equalising pulse duration:
2.3µs ±0.05µs

Sc-H phase:
0°± 5°

3.7 Auxillary Functions

3.7.1 Monitor Output

Impedance:
75Ω
Return loss:
≥36dB to 6MHz

Same performance as "PROGRAM OUT".

3.7.2 Test Out

Impedance:
75Ω
Return loss:
≥36dB to 6MHz

Same performance as the "PROGRAM OUT", except when the generator is in BYPASS mode.
Diff. phase:
≤0.3°
Diff. gain:
≤0.3%

3.7.3 Test Signal Output

Impedance:
75Ω
Return loss:
≥36dB to 6MHz

Specification as stated above under Test Signal Genarator

3.7.4 Sync Out

Impedance:
75Ω
Return loss:
>30dB to 5MHz
Amplitude:
2V ±10% or
286mV ±10% (selectable)
Sync rise time:
140ns ±10ns
Front porch duration:
1.5µs ±0.1µs
Horizontal sync duration:
4.7µs ±0.1µs
Vertical serration duration:
4.7µs ±0.1µs
Equalising pulse duration:
2.3µs ±0.05µs
S/N ratio:
≥70dB unweighted in 5MHz

Output may be configured also to carry burst signal **(no set-up)** or serve as an additional TEST SIGNAL output

3.8 Sync Generator

Normally locks onto PROGRAM IN, but configurable to EXT1.

Locks both on color signal as well as black/white signal.

Alien systems (PAL and SECAM) are ignored, alien signal can be fed through the instrument without clamping.

3.8.1 Internal Mode

Subcarrier frequency:
3.579545MHz ±1ppm
Sc-H phase accuracy:
0° ±5°

3.8.2 External Mode

Lock-up time:
<1sec.
Input level:
+6 to -6dB

Burst lock:
≤1° burst phase change for input sync or burst change of ±3dB relative to 286mV
≤2° burst phase for input sync or burst change of ±6dB relative to 286mV
≤1° burst phase over 10% to 90% APL
Lock range:
3.579545MHz ±20Hz
Sc-H phase accuracy:
0° ±5°
Sync lock jitter:
≤10ns for input sync change of 286mV ±3dB (noise free input signal)

Noise performance, remains locked with:
Negative luminance:
≥100mV above sync bottom
S/N ratio:
≥26dB
Hum:
≤100% of video level, minimum ≤1V_{PP}
Co-channel interferens:
≤70mV_{PP}

3.9 Remote Control

Connector:
25 pole sub-D
Signal levels:
TTL in/out for controls and status flags
Loading of pins:
Output low (R_{OUT} = 1kΩ)
V_{OUT} = 0.8V @ I_{OUT} = -0.8mA
Output high (R_{OUT} = 3.7kΩ)
V_{OUT} = 2.4V @ I_{OUT} = 0.7mA
All pins protected against voltages upto ±25V.
Power supply pin:
I_{OUT} > 50mA

3.10 Test Signal Specification

3.10.1 VITS Signals For Insertion

3.10.1.1 NTC7 Composite

White bar
Luminance amplitude:
100IRE ±0.7IRE
Rise and fall time:
125ns ±5ns with integrated sinesquared shape.
Tilt:
≤0.5%
Overshoot/undershoot:
≤1.5%

2T pulse
Amplitude:
within 0.5IRE of luminance bar
Half amplitude duration:
250ns ±10ns
Ringing:
<1IRE

Modulated 12.5T pulse
Amplitude:
within 0.5IRE of luminance bar
Half amplitude duration:
1.57µs ±0.05µs
Inherent chrom/lum. amplitude inequality:
≤0.5%
Inherent chrom/lum. delay inequality:
≤5ns
Chroma phase:
burst phase ±1°

Superimposed 5-riser staircase
Amplitude of staircase:
90IRE ±1IRE
Nominal amplitude of risers:
within ±1% of 1/5 of peak-peak amplitude of the staircase.
Rise/fall time:
250ns ±10ns
Chroma amplitude:
40IRE ±0.4IRE
Inherent diff. gain:
<0.25% (10 to 90% APL)

Inherent diff. phase:
<0.2% (10 to 90% APL)
Rise/fall time of chroma envelope:
400ns ± 25ns
Chroma phase:
as burst ±1°

3.10.1.2 NTC7 Combination (CCIR Rec. 473-5)

White flag
Amplitude:
100IRE ±0.7IRE
Rise and fall time:
125nsec ±5nsec
Overshoot/undershoot:
≤1%
Tilt:
≤0.5%

Multiburst
Amplitude peak-peak:
50IRE ±1IRE
Pedestal amplitude:
50IRE ±0.5IRE
Frequencies:
0.5, 1.0, 2.0, 3.0, 3.58, and 4.2MHz; all ±1%
Harmonic content:
less than 40dB below fundamental
Start/stop:
Zero phase
Envelope rise time of bursts:
400ns

Superimposed 3-level chroma signal
Peak-peak amplitudes:
1st section : 20IRE ±0.2IRE
2nd section : 40IRE ±0.4IRE
3rd section : 80IRE ±0.4IRE
Rise/fall time:
400ns ± 25ns
Phase:
90°
Inherent intermodulation:
≤0.25%

3.10.1.3 FCC Composite

Superimposed 5-riser staircase
Luminance amplitude:
80IRE ±0.5IRE
Step inequality:
<0.5IRE
Rise/fall time:
250ns ±10ns

Chrominance amplitude:
40IRE ±0.4IRE
Rise and fall time of chroma:
375ns ±25ns
Phase of chominance:
in phase with burst

2T pulse
Peak amplitude:
within 0.5IRE of line bar
Half amplitude duration:
250ns ±10ns
Over/undershoot:
<1.0IRE

Modulated 12.5T
Peak amplitude:
within 0.5IRE of line bar
Half amplitude duration:
1.57µs ±0.05µs

Line bar
Amplitude:
100IRE ±0.7IRE
Rise/fall time:
250ns ± 15ns
Overshoot/undershoot:
<1IRE

3.10.1.4 FCC Multiburst

White reference bar
Amplitude:
100IRE ±0.7IRE
Rise and fall time:
250nsec ±25nsec
Pedestal amplitude:
40IRE ±0.5IRE

Multiburst amplitude:
60IRE ±0.5IRE
Frequencies:
0.5, 1.25, 2.0, 3.0, 3.58, and 4.1MHz.
Frequency accuracy:
±1%
Start/Stop:
Zero phase
Envelope rise time of bursts:
400ns
DC content:
<0.25IRE

3.10.1.5 FCC Color bar

Number of bars:
8
Sequence:
white, yellow, cyan, green, magenta, red, blue, and black
White amplitude:
100IRE ±1IRE
Luminance accuracy:
±1%
Chroma amplitude:
according to standard ±2%.

3.10.1.6 VIRS

Chrominance reference
Amplitude:
40IRE ±0.5IRE
Rise/fall time of chroma:
1µs ±0.05µs
Chroma phase:
within 1° of burst
Pedestal level:
70IRE ±0.5IRE
Rise/fall time of pedestal:
250ns ±10ns

Luminance reference
Amplitude:
50IRE ± 0.5IRE
Rise/fall time of pedestal:
250ns ±10ns

Black reference
Amplitude:
7.5IRE ±0.5IRE
Rise/fall time of pedestal:
250ns ±10ns

3.10.1.7 Multiburst, 100%

Amplitude:
100IRE ±1IRE
White reference:
100IRE ±1IRE
Frequencies:
0.5, 1.25, 2.0, 3.0, 3.58, and 4.1MHz

3.10.1.8 Multiburst, 60%

Amplitude:
60IRE ±1IRE
References:
70IRE and 10IRE
Frequencies:
0.5, 1.0, 2.0, 3.0, 3.58, and 4.1MHz
Pedestal:
40IRE

3.10.1.9 Color bar, 75%

Number of bars:
7 of equal width
Luminance rise time:
200ns ±10ns
Luminance accuracy:
±1IRE

3.10.1.10 SinX/X

Bandwidth:
Flat to 4.2 (-3dB at 4.75MHz), positive and negative pulses.
Flatness:
Group delay : <5ns
Amplitude : ±0.1dB
Pedestals:
24 and 76IRE
Peak:
90IRE

3.10.1.11 SinX/X with Reduced Amplitude

Bandwidth:
Flat 0 to 4.2MHz (-3dB at 4.75MHz), positive and negative pulses.
Flatness:
Group delay : <5ns
Amplitude : ±0.1dB
Amplitude:
70% of the above SinX/X signal

3.10.1.12 Multipulse, 100IRE

Frequencies:
1.0, 2.0, 3.0, 3.58, and 4.2MHz.
Amplitude:
100IRE ±1IRE
White reference and 2T pulse:
100IRE

3.10.1.13 Multipulse, 70IRE

Frequencies:
1.0, 2.0, 3.0, 3.58, and 4.2MHz
Pedestal:
10IRE
Amplitude:
70IRE ±1IRE
Reference and 2T pulse:
70IRE

3.10.1.14 Red Signal, 75%

75% red signal

3.10.1.15 Ramp Signal with Chroma

Luminance ramp:
0 to 100IRE
Chroma amplitude:
40IRE
Chroma phase:
at burst phase

3.10.1.16 Ramp Signal

Luminance ramp:
0 to 100IRE

3.10.1.17 5 Step Luminance Staircase with Chroma

Luminance amplitude:
100IRE
Step inequality:
0.5IRE
Chroma amplitude:
40IRE
Chroma phase:
at burst phase

3.10.1.18 5 Step Luminance Staircase

Luminance amplitude:
100IRE
Step inequality:
0.5IRE

3.10.1.19 Pulse and Bar Signal

12.5T modulated pulse
2T pulse
White bar with inverse 2T

3.10.1.20 Ghost Ref. Signal, Philips-type

Acc. to ITU-R BT1124, Signal C

3.10.1.21 Ghost Ref. Signal, BTA-type

Acc. to ITU-R BT1124, Signal A

3.10.1.22 Ghost Ref. Signal, Korean-type

Acc. to ITU-R BT1124, Signal B

3.10.1.23 Line Sweep

Sweep range:
up to 5MHz
Pedestal:
50IRE ±1%
Amplitude:
100IRE ±1IRE

3.10.1.24 250kHz (2T Shape)

Amplitude:
100IRE ±1IRE
Rise and fall time:
250nsec ±20nsec
Overshoot:
<0.5%
Tilt:
<0.5%

3.10.1.25 Eyetest Line A and B

For the measurement of eyeheight, the two lines being of opposite phase.

Test signal of 5.727272Mbit/s

3.10.1.26 Reflection Pulse

2T sinesquared pulse
Width:
250ns ±10ns
Position:
middle of line

3.10.1.27 Stereo Sound Code

Pulse amplitude:
90IRE
Pulse start:
29µs from leading edge of sync
Pulse width:
5µs

3.10.1.28 Dual Sound Code

Pulse amplitude:
90IRE
Pulse start:
22µs and 46µs from leading edge of sync
Pulse width (each pulse):
5µs

3.10.1.29 Flat Field Signals:

0IRE Black
7.5IRE Black
10IRE Black
50IRE Grey
90IRE White
100IRE White

Amplitude accuracy:
±1IRE
Rise and fall time:
250ns ±20ns

3.10.1.30 TEK ID Codes

For identification of the source, a specialized code for the VM700 can be inserted into program signal.

Fixed codes with the following addresses (binary, LSB to MSB):

code 1	1100 0000 0000 0001
code 2	1110 0000 0000 0001
code 3	1111 0000 0000 0001
and continuing to	
code 9	1111 1111 1100 0001
code 10	1111 1111 1110 0001

3.10.2 APL Signals

Full field testing of the influence of *Average Picture Level* (APL).

– Any one of the VITS lines repeated line alternatively.

– Any one of the VITS line repeated every 5 lines, the intervening lines being 0, 50, or 100IRE level or bouncing between the 0 and 100IRE levels. Bounce rate adjustable: 0.1-25.5 sec

3.11 Other Signals

3.11.1 AC-Bounce Signal

Full field signal switching between 10 and 90IRE
Rate:
adjustable 0.1 to 25.5 sec.

3.11.2 SMPTE Color Bar

67% of picture height with 7-bar color bar
8% of picture height with reversed blue bars
25% of picture height with -I/white/+Q/PLUGE

3.11.3 EIA Color Bar

75% of picture height with 7-bar color bar
25% of picture with -I/white/+Q/PLUGE

Rise/fall time of luminance:
200ns ±10ns

3.11.4 Bars Over Red

FCC color bar:
upper 2/3 of field
Red:
75% bottom 1/3 of field

3.11.5 Squarewave, 60Hz, (2T Shape)

Amplitude:
100IRE ±1IRE
Rise and fall time:
250nsec ±20nsec
Overshoot:
<0.5%
Tilt:
<0.5%.

3.11.6 Eyetest Pattern

Pattern composed of two eyetest lines of opposite phase

Bit rate:
5.727272Mbit/s

3.12 Pattern Composition, Philips 4:3 Format

3.12.1 Signals Inside the Circle

From top to bottom:

Black rectangle on white background.
Width of rectangle:
11.3µs.

Black/white and white/black transition with needle pulse in the white part.
Width of pulse:
280ns ±5%

250 kHz squarewave signal.
Amplitude:
75% of white (same amplitude as the RGB components of the 75% color bar).

Color bar (without white and black).
NTSC color bar (77/7.5/77/7.5).

Center cross.
Width of vertical lines:
280ns ±5%
Structure of the horizontal line:
2 lines, one per field, sequence reversed compared to the lines of the background crosshatch.

Multiburst.
Frequencies:
0.5, 1.0, 2.0, 3.0, and 4.0 MHz
Amplitude:
100 % of white level

5-riser staircase.

White/black and black/white transitions.

Color steps.
Yellow/red/yellow.

Circle.
Diameter:
84 % of active picture height

3.12.2 Color Signals Outside the Circle

The signals are described as vectors, chroma amplitude approx. 310mV.

From left to right:

Vertical bars with R-Y signals (270° and 90°) and B-Y = 0.

Rectangles with signal G-Y = 0 (326° and 146°).

On the right of the circle:

Rectangles with signal G-Y = 0 (326° and 146°).

Vertical bars with B-Y signals (0° and 180°) and R-Y = 0.

3.12.3 Background Signals

Cross-hatch.
14 horizontal x 18 vertical lines.
Width of vertical lines:
280ns ±5%
Background level:
52% of white

Black/white border castellations.

3.13 Pattern Composition, Philips 16:9 Pattern

3.13.1 Signals Inside the Circle:

From top to bottom:

Black rectangle on white background.

Black/white and white/black transition with needle pulse in the white part.
Width of pulse:
250ns ±5%

250 kHz squarewave signal.
Amplitude:
75% of white (same amplitude as the RGB components of the 75% color bar).

Color bar (without white and black).
NTSC color bar (77/7.5/77/7.5)

Center cross.
Width of vertical lines:
250ns ±5%
Structure of the horizontal line:
2 lines, one per field, sequence reversed compared to the lines of the background cross-hatch.

Multiburst.
Frequencies:
0.5, 1.0, 2.0, 3.0, and 4.0MHz
Amplitude:
100% of white level

5-riser staircase.

White/black and black/white transitions.

Color steps.
Yellow/red/yellow.

Circle.
Diameter:
84% of active picture height

3.13.2 Color Signals Outside the Circle

The signals are described as vectors, chroma amplitude approx. 310 mV.

On the left side of the circle:
2 vertical bars with R-Y signals (270° and 90°) and B-Y = 0.

2 rectangles with signal G-Y = 0 (326° and 146°).

On the right side of the circle:

2 rectangles with signal G-Y = 0 (326° and 146°).

2 vertical bars with B-Y signals (0° and 180°) and R-Y = 0.

3.13.3 Background Signals

Cross-hatch.
14 horizontal x 24 vertical lines
Width of vertical lines:
250ns ±5%
Background level:
52% of white

Horizontal overscan marks.
4 and 6%

Vertical overscan marks.
5 and 6%

Black/white border castellations, 4.7% horizontally, 4.2% vertically.

Vertical sweep ranging from 100 to 350 TV-lines.
Resolution wedges:
100-250 and 200-350 TV-lines
Center rings:
250 TV-lines

Blocks with diagonal lines 250 and 175 TV-lines of resolution.

3.14 Transmitter Test Signal (TTS)

2T pulse
Line bar
18µs wide

Modulated staircase
3 chroma blocks
-(R-Y), R-Y, and B-Y (top to bottom)
Black level setting
8 horizontal lines in bottom of picture

3.15 Matrix Pattern

Equal segments of:
NTC7 Composite
NTC7 Combination
Color bar
SinX/X
50IRE

3.16 Insertion of Text

Text can be inserted from a programmable text generator into the full-field patterns.

The character set includes alphanumeric and numerical characters together with special symbols, *refer to Appendix A2.*

Number of pages:
16
Number of characters per page:
12 lines of maximum 24 characters in the active field and one line of 24 characters in the vertical blanking interval (lines 10-16)
Character format:
12 by 18 dots

Test signal or external signals always take priority over the text.

3.17 Environmental Conditions

3.17.1 Climatic Conditions

Ambient temperature:
5°C to 45°C (41°F to 113°F)
Limit range for storage and transportation:
-20°C to 60°C (-4°F to 140°F)

3.17.2 Mechanical Requirements

Vibration:
Limit range for storage and transport:
30min. in each of three directions, 10 to 150Hz;
0.7mm$_{PP}$ and 50m/s^2 max. acceleration.
According to IEC-Publ. 68, test Fc.
NOTE: Unit mounted on vibrating table without shock absorbing material.

Bump:
Limit range for storage and transport:
1000 bumps of 100m/s^2 sine, 6ms duration in each of the 3 directions.
According to IEC-Publ. 68, test Eb.

Packaging
According to UN-D-1400.
The test methods mentioned in the N.V. Philips Standard UN-D-1400 are in accordance with those of the relevant ISO-standards.

3.18 Reliability

MTBF:
>20.000hours
MTBC:
>1 year

3.19 Safety & EMC

Safety:
According to IEC 348 Class 1.
Electromagnetic compatibility:
In accordance to FCC Rules and regulations, Part 15, subpart J, level B.
In accordance with EN 55022/1987 class B (CISPR22/1985) and EN 50082/1992

Electromagnetic field strength:
≤10V/m

3.20 Power Supply

Mains supply voltage:
100, 120, 220, or 240 VAC, +10%/-15%, max. 250V
Mains supply frequency:
48 - 65Hz
Power consumption:
50VA (without options)
Max. 60VA (with all option mounted)

3.21 Mechanical Data

19" rack mount cabinet.

Height	: 44mm	(1.73")
Width	: 483mm	(19")
Depth	: 470mm	(18.5")
Weight	: 6kg	(13.2lbs)

3.22 Default Setting of Instrument

The following describes the default setting of the main parameters at delivery.

VITS (all groups):
Line 17 field 1: NTC7 Composite
Line 19 field 1: Philips Ghost
Line 17 field 2: NTC7 Combination
Line 19 field 2: Philips Ghost

Substitution signal:
Philips 4:3 pattern

Test signal output:
SMPTE pattern

3.23 Options

3.23.1 PM 8551: Remote Interface, IEEE-488 /RS232

By means of the intelligent remote control options it is possible to control all the functions in the instrument; furthermore status information is available.

The remote control option can co-exist together with the built-in TTL control.
RS232:
9 pole male sub-D connector
Baud rate, stop and parity bits are programmable via dip switches

IEEE-488:
24 pin female Amphenol connector in compliance with the IEEE-488 standard
Address setting is software programmable via menu

Misc.:
Local Lock prevents access to the instrument via the front plate controls.

Global lock out puts the interface in full control, overriding the functions of the simple TTL interface.

3.23.2 PM 8554: Linear Video Keyer

The optional Video Keyer functions enables insertion of customers logo which very often is permanently inserted in a corner of the active video area.

The key function can be used with:
either an external key signal and video fill signal
or
an internally generated key and video fill signal.

External Key and fill signals.
Amplitude:
Nominal 100IRE of video amplitude (sync and burst allowed)
Black key signal (7.5IRE) attenuates the logo signal 100%
White key signal (100IRE) attenuates the logo signal 0%

The internally generated key signal is adjustable for obtaining the required transparency.

Characteristics for the program path.
Frequency response:
±1% up to 6MHz
Differential gain:
≤0.2%
Differential phase:
≤0.15°

Note: The Video Keyer is not available simultaneously with the Video Processor option.

3.23.3 PM 8555: Video Processor

The Video Processor module restores the program signal before transmission, i.e. limits video level, controls the video level automatically or manually, inserts new sync, etc.

This options facilitates the regeneration of the program video before transmission.

Main Functions.

Restoration of video level, either manually or automatically by measurement of white on VITS signal, i.e. NTC7 composite or FCC composite.

Loss of reference will cause the regulation to be sustained until the reference signal appears again. Alternatively the video signal may be exposed to a predetermined amplification.

Sync can be automatically gain controlled together with the video content or substituted by an internally generated sync pulse.

White clip limits the luminance amplitude to nominal 100IRE video. Limiter acts after video regulation.

Sync reinsertion ensures a clean and nominal sync pulse for the following chain, and is taking place after the video restoration.

Specification.

White output level regulated to 100IRE ±1IRE for a white input level of 100IRE ±30IRE.

Timing for inserted sync compared to program signal:

± 50 ns

Reference signal:

In line 10- 20 field 1 and/or field 2

Manual gain:

Min. 0.76 and max. 1.42

Differential gain:

≤0.5% at 100IRE

Differential phase:

≤0.5° at 100IRE

Static non-linearity:

≤1% at 100IRE

Signal/noise ratio measured on an active line:

≥ 60 dB unweighted, or ≥ 70 dB weighted.

3.23.4 PM 8557: Detector for Non-synchronous External Inputs

This option ensures that the applied EXT1, EXT2, EXT3, and EXT4 only are gated into the program signal if they are in phase and locked to the program signal.

For detection it is required, that the external signals carry a sync.

Timing of the sync shall be according to: RS170A/SMPTE 170M and CCIR rec 624-4.

When signals are non-synchronous the inserter will be put into the PASS condition for the corresponding lines.

Sync level on ext. signal:

40IRE ± 6 dB

Noise:

<-30dB on a nom. sync signal

Hum:

<1V_{PP} and less than 100%

Non-synchronous signals if:

H-timing error > 450 ns ± 250 ns

or/and V-timing error

3.24 Signals Waveform

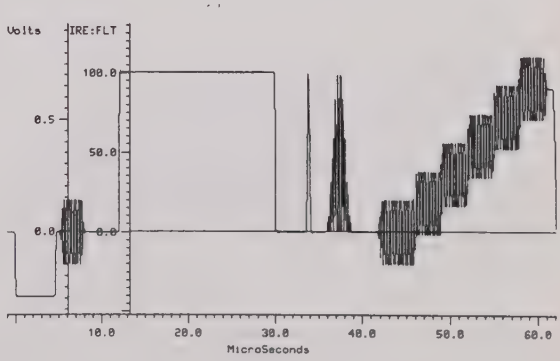


Fig. 3-1 NTC7 Composite

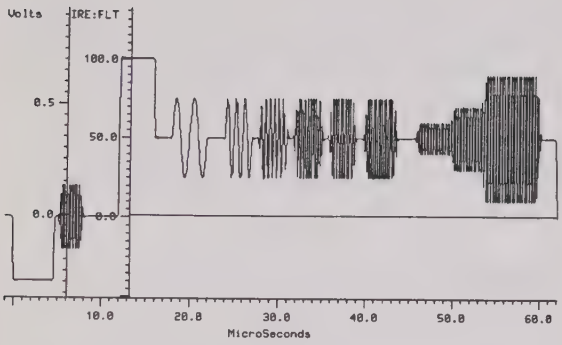


Fig. 3-2 NTC7 Combination

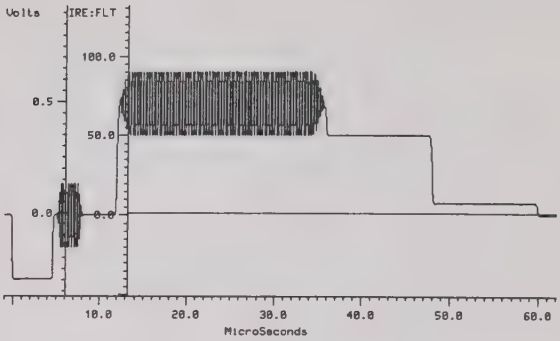


Fig. 3-5 VIRS

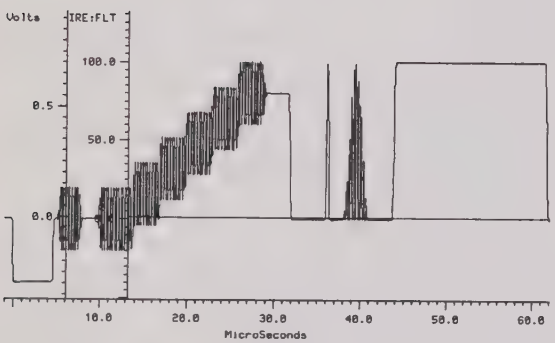


Fig. 3-3 FCC Composite

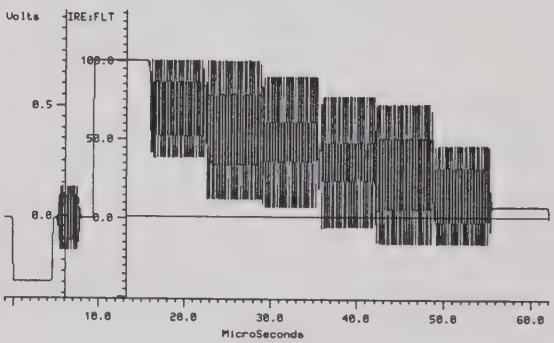


Fig. 3-6 FCC Color Bar

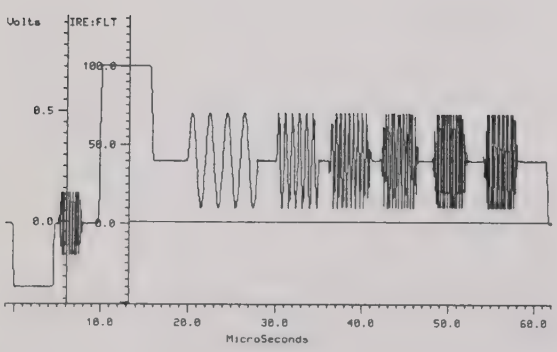


Fig. 3-4 FCC Multiburst

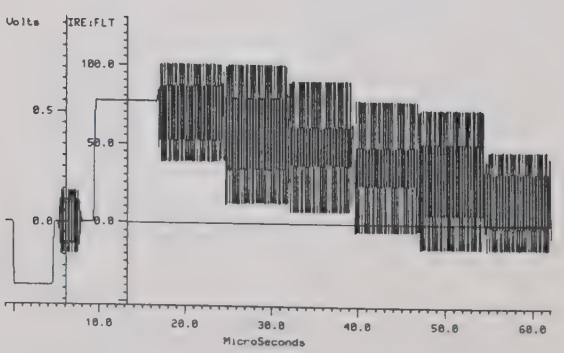


Fig. 3-7 Color Bar, 75%

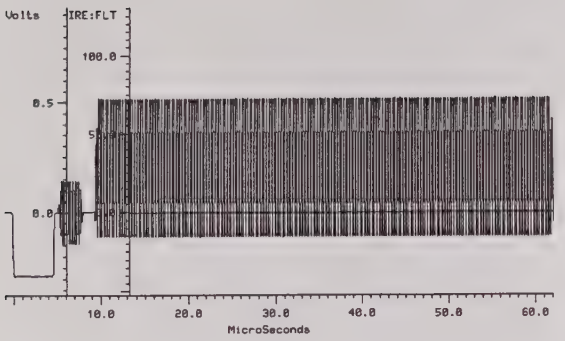


Fig. 3-8 Red, 75%

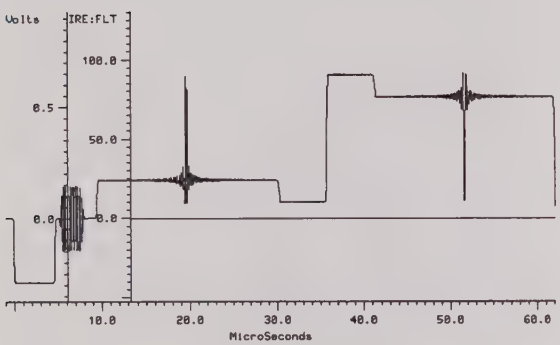


Fig. 3-9 SinX/X, 100%

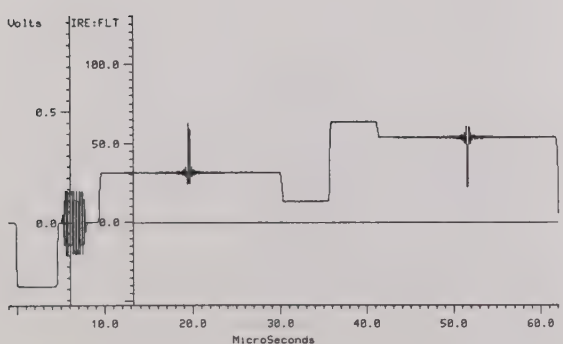


Fig. 3-10 SinX/X, 70%

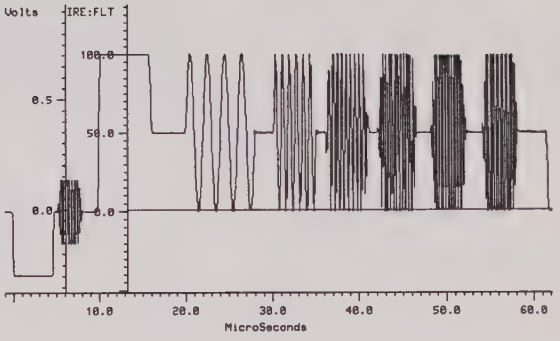


Fig. 3-11 Multiburst, 100%

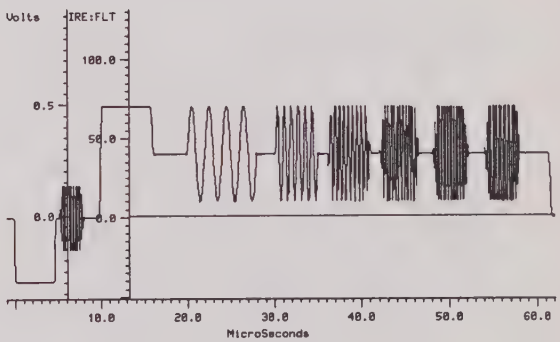


Fig. 3-12 Multiburst, 60%

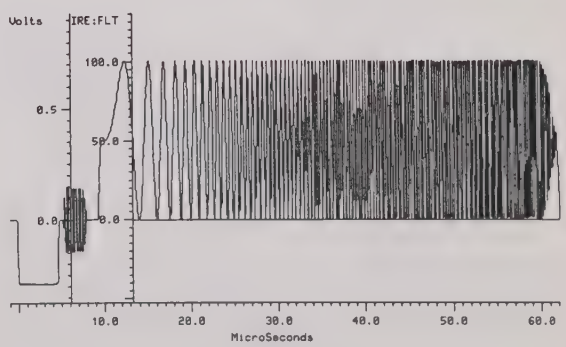


Fig. 3-13 Linesweep 5MHz

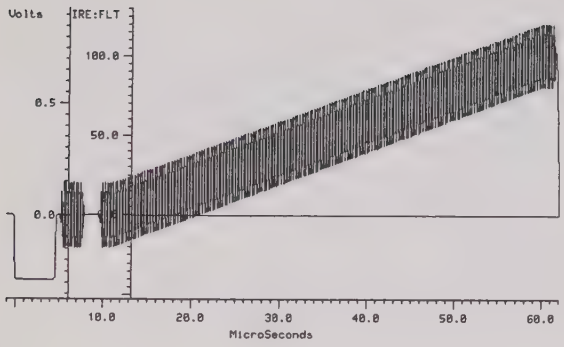


Fig. 3-14 Ramp Modulated

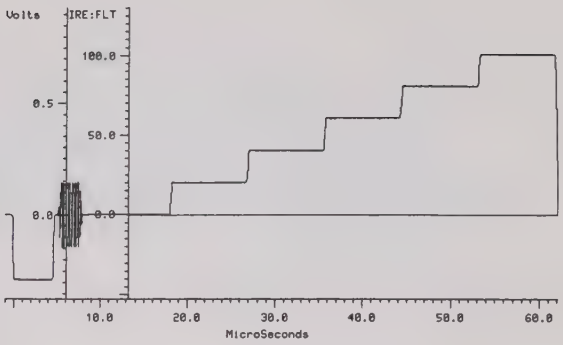


Fig. 3-17 Staircase Luminance

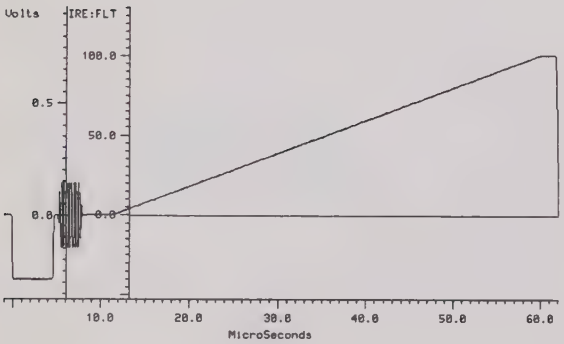


Fig. 3-15 Ramp Luminance

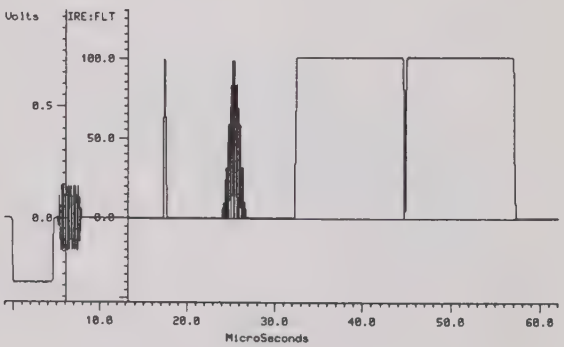


Fig. 3-18 Pulse & Bar

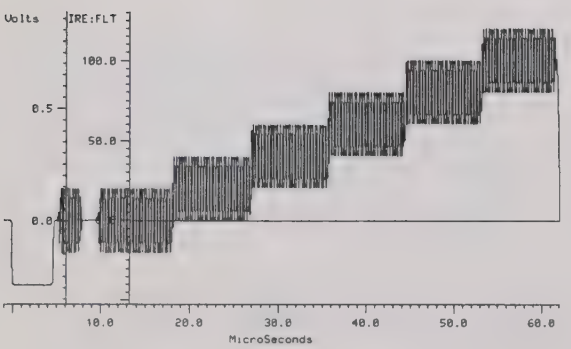


Fig. 3-16 Staircase Modulated

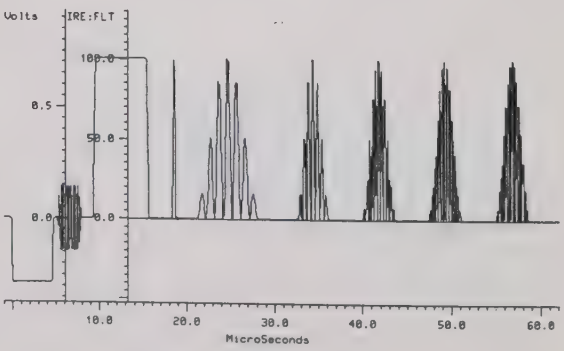


Fig. 3-19 Multipulse, 100%

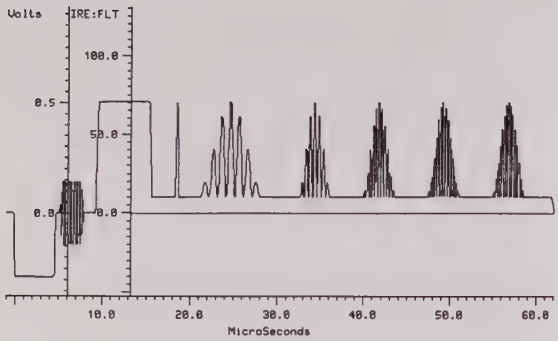


Fig. 3-20 Multipulse, 70%

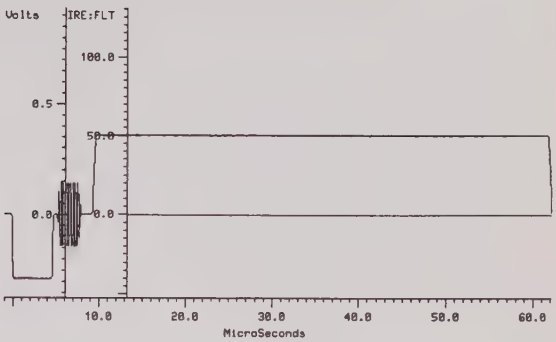


Fig. 3-23 Grey 50IRE

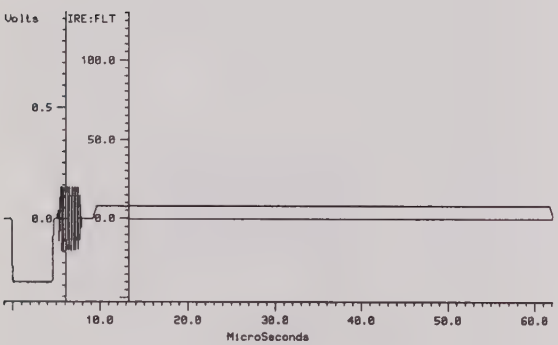


Fig. 3-21 Black 7.5IRE

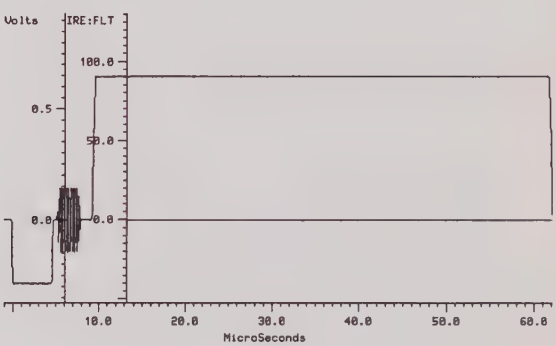


Fig. 3-24 White 90IRE

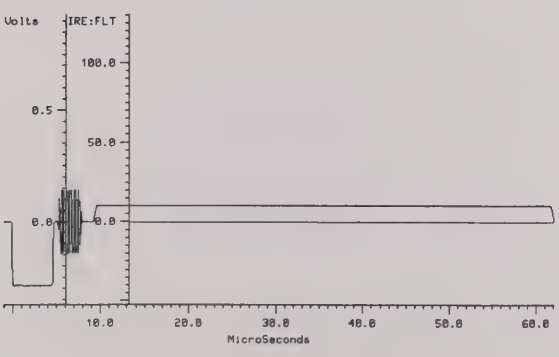


Fig. 3-22 Black 10IRE

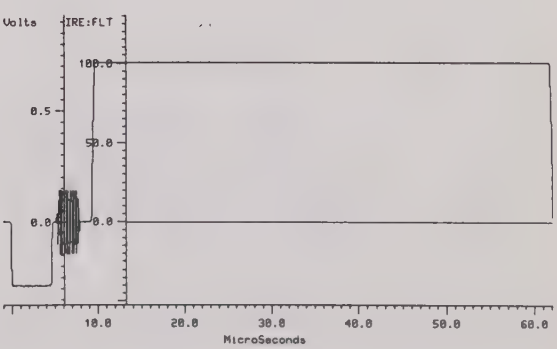


Fig. 3-25 White 100IRE

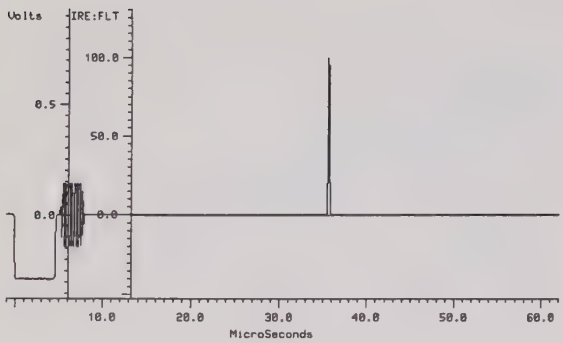


Fig. 3-26 2T Refl. Pulse

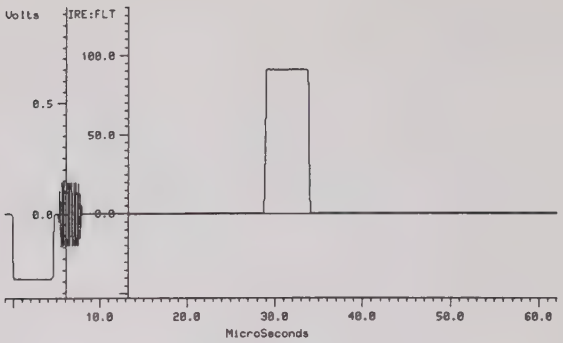


Fig. 3-29 Sound Stereo

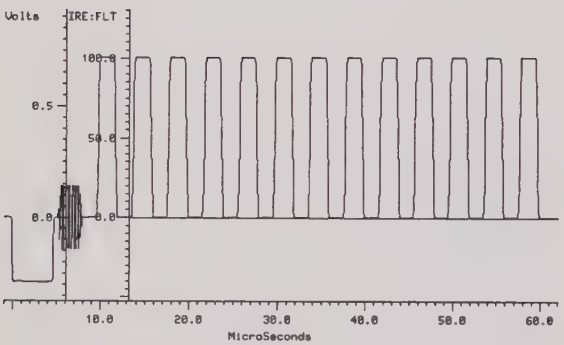


Fig. 3-27 Sq. wave 250kHz

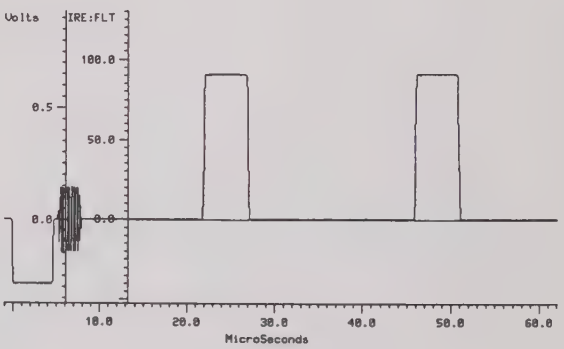


Fig. 3-30 Sound Dual

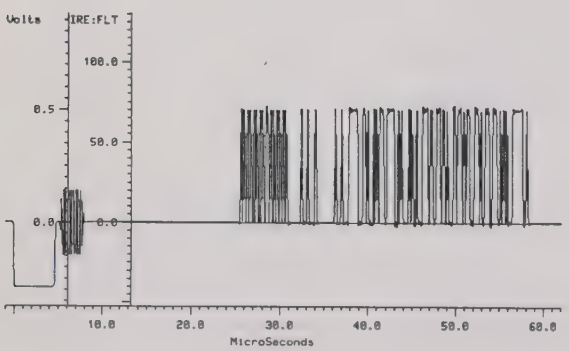


Fig. 3-28 Eyetest, Line 1

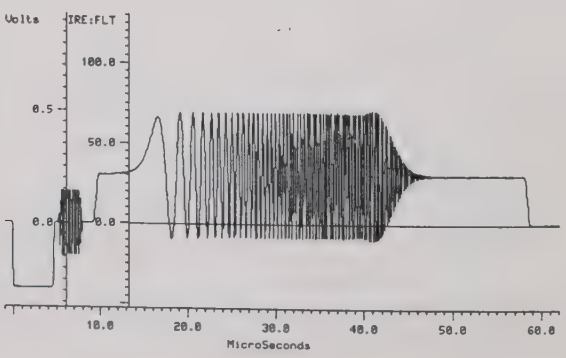


Fig. 3-31 Ghost Philips

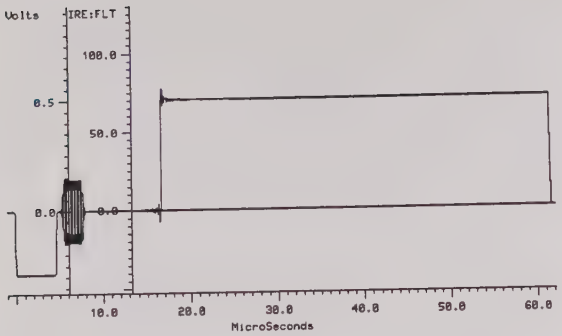


Fig. 3-32 Ghost BTA

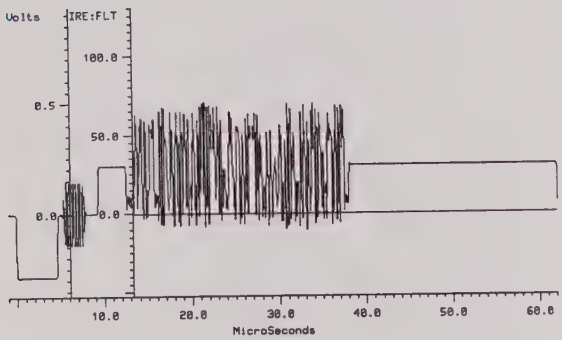


Fig. 3-33 Ghost Korea

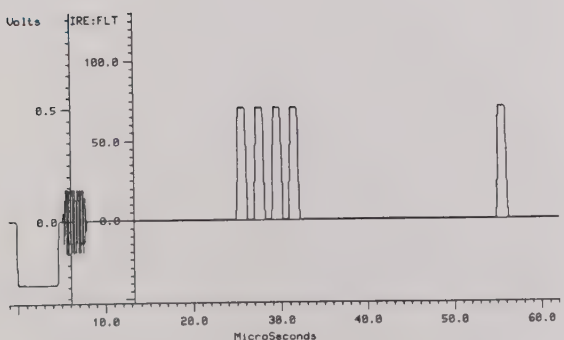


Fig. 3-34 TEK ID Code

4. Accesories and Options

4.1 Accessories

Item:	Quantity:	Ordering Number:
Mains cable		5322 321 10594
Mains cable, US	1	5322 321 10123
Instruction manual	1	9499 493 09611

4.2 Options

Description	Ordering Number
PM 8551/20 : Remote Interface, RS232	9449 085 51201
PM 8551/30 : Remote Interface, IEEE-488	9449 085 51301
PM 8552 : Rack Mounting Kit	9449 085 52001
PM 8554 : Linear Video Keyer	9449 085 54008
PM 8555 : Video Processor	9449 085 55008
PM 8557 : Asynch. Detector	9449 085 57001

INSTALLATION AND OPERATING INSTRUCTIONS

5. Installation

5.1 Initial Inspection

Check the contents of the shipment for completeness and possible transport damage. If the contents are incomplete or damaged, a claim should be filed with the carrier immediately, and the Philips Sales or Service organization should be notified in order to facilitate the repair or replacement of the instrument.

5.2 Safety Instruction

5.2.1 Earthing

Before any other connection is made, the instrument must be connected to a protective earth conductor via the three-core mains cable.

Before connecting the equipment to the mains of the building installation, the proper functioning of the protective earth lead of the building installation needs to be verified.

WARNING: Any interruption of the protective conductor inside or outside the instrument, or disconnection of the protective earth terminal, is likely to make the instrument dangerous. Intentional interruption is prohibited.

5.3 Mains Voltage Setting and Fuses

Before inserting the mains plug into the mains socket make sure that the instrument is set to the local mains voltage.

NOTE: If the mains plug has to be adapted to the local situation it should only be done by a qualified person.

The mains connector of this instrument is specially constructed for safety. It is impossible to change the mains fuse or alter the operating voltage without removing the mains cable first.
The instrument can be used with a mains voltage supply of 100V, 120V, 220V or 240V AC +10%-15% (max. 250V AC).

- Remove the mains cable.
- Slide the protective plastic cover to the left to expose the fuse and coded mains plug. *See fig. 5-1.*

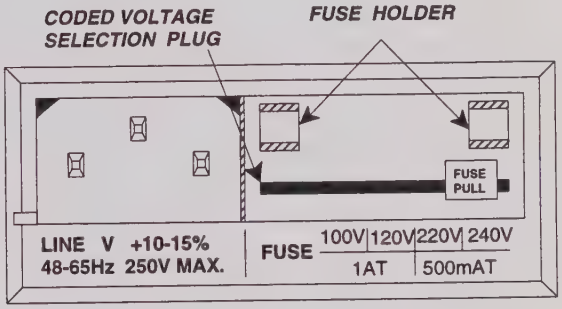


Fig. 5-1 Mains connector.

- Remove the fuse by pulling the black lever.
- The text printed on the coded mains plug is now visible.
- If the text does not agree with the local mains supply, insert a pointed instrument into the hole and remove the coded plug.
- Re-insert the plug so that the visible text agrees with the local mains voltage. (This is the number on the top-left portion of the card).
- Insert the mains fuse with one of the proper rating.
- Slide the protective cover to right.
- Re-insert the mains cable.

WARNING: If mains voltage has to be adapted to the local supply, it must only be done by a qualified person who is aware of the hazards involved. Make sure that only fuses of the required current rating and specified type are used for renewal. The use of repaired (jumpered) fuses and/or the short circuiting of the fuse holders is prohibited. Fuses must only be replaced by a qualified person who is aware of the hazards involved.

5.4 Rack Mounting

This PHILIPS PTV instrument is delivered (can be mounted) in a 19" cabinet. In systems where several cabinets are mounted in a 19" rack, special attention must be paid to the temperature. To avoid overheating, we recommend the following solutions:

5.4.1 Free Air Convection

Mount an air-flow unit (e.g. type PM 9799) between or underneath the cabinets. The dimensions of this unit is 1U high (=4.5cm/1$^3/_4$") and 19" wide.

5.4.2 Forced Circulation

Mount a ventilation unit (e.g. PE1373 mounted with 2 fans PE1374) between or underneath the cabinets. The dimensions of this unit are 1U high (=4.5cm/1$^3/_4$") and 19" wide.

5.4.3 Installation of Rack Mounting Kit PM 8552

The rack slides mount in any rack with a front-to-rear spacing between 18 and 27 inches. Reserve clearance between the rear panel of the instrument and the cabinet panel for connectors and to provide necessary air circulation.

Mounting of slide tracks.

1. Mount the chassis section of the rack slide kit to the instrument with the snap latch at the rear. Make sure that the screws are secured.
2. Mount the rails using the hardware shown in the figure. Align the stationary sections both horizontally and in level.

Installing of the instrument.

1. Pull the slide-out section to the fully extended position.
2. Insert the instrument chassis section into the slide-out sections.

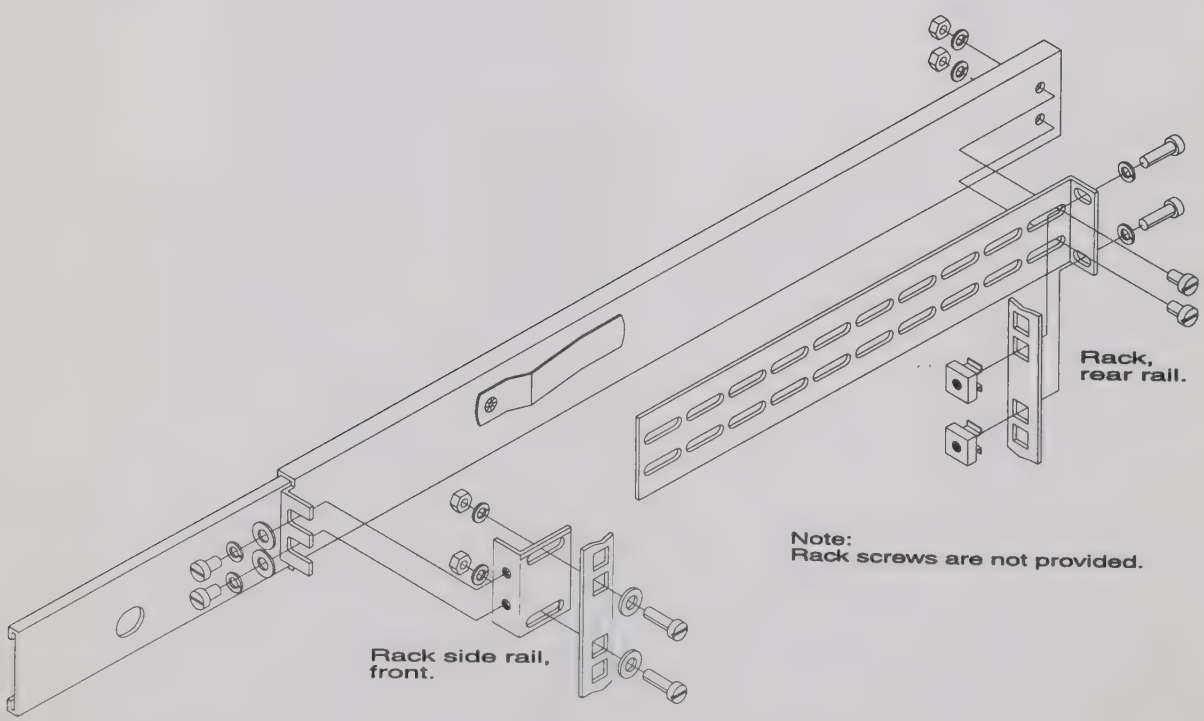


Fig. 5-2 Installation of Rack Mounting Kit

3. Press the snap latches and push the instrument towards the rack frame until the latches snap into their holes.
4. Press the stop latches again and push the instrument totally into the rack.
5. Fix the instrument by means of the front panel screws.

After installation, the slide tracks might need to be slightly adjusted to ensure smooth operation. To do so, pull the instrument halfway out, slightly loosen the screws holding the tracks to the front rail, and allow the tracks to settle to an unbound position. Tighten the screws and by pulling the instrument in and out several times ensure smooth operation.

Removal of instrument.

1. Loosen the screws in the rack frame and pull the instrument forward until the stop latches snap into their holes.
2. Press the stop latches and remove the instrument. Be sure that all cabling is disconnected before removing the instrument.

5.5 Access to and Replacement of Parts

5.5.1 Safety

The opening of covers or removal of parts, expect those to which access can be gained by hand, is liable to expose live parts.

The instrument must be disconnected from all voltage sources before performing any adjustment, replacement, maintenance, or repair which requires the instrument to be opened. If repair of the opened instrument is unavoidable, it must only be carried out by a skilled person who is aware of the hazards involved.

5.5.2 Access to Units

Remove all screws on the top plate. Lift up the top-plate. Units are now accessible.

5.6 Cleaning

Disconnect the instrument from the mains voltage supply before cleaning.

Use only a damp cloth.

Make sure that no liquid is spilled inside the instrument before it is reconnected to the mains voltage supply.

6. Configuration

6.1 General Information

At delivery the instrument is set-up for a standard configuration, which can be changed according to the description below.

This re-configuration is done without the need for special spares and specializes test equipment. The correct setting of programming plugs, jumpers, etc., which are not used for configuration, is also shown in this chapter.

The configuration is divided into two parts:

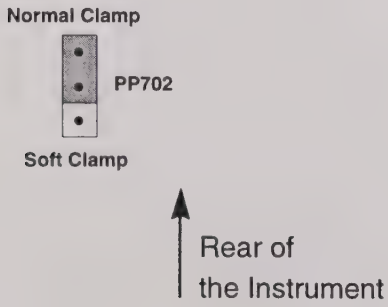
1. Hard-wired configuration by means of internal jumpers, etc.
2. Software controlled configuration via front plate.

6.2 Jumper Configuration

6.2.1 Program Clamp

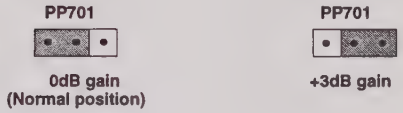
PP702 selects between soft and hard clamp. When an off-air received signal exhibits Co-channel Interference, it is necessary to change to the soft clamp.

To provide maximum clamping efficiency the PP702 should be placed as follows:



6.2.2 Input Gain

The input buffer provides 3dB extra gain for compensation of external passive cable equalizer. PP701 must be located as follows:



6.2.3 Sync Out

This output circuitry may be configured to different signal types:

Sync:

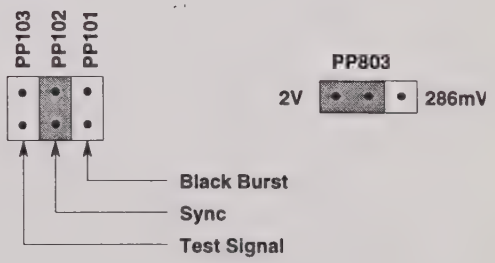
286mV$_{PP}$ or 2V$_{PP}$ (PP803 sets the amplitude).

Black Burst:

Test signal output, similar to the signal on the TESTSIGNAL connector.

Note: In position Black Burst and Test Signal the gain should be set to "286mV" position.

To provide a 2V$_{PP}$ Sync output signal, the jumpers PP101, PP102, and PP103 should be located as follows:



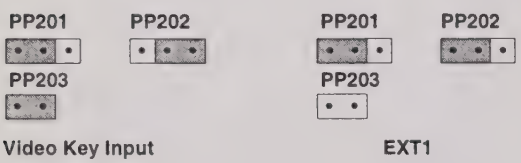
6.2.4 PROGRAM OUT Monitor

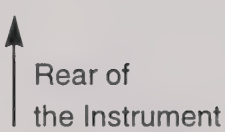
The monitor out amplifier provides a facility of monitoring the PROGRAM OUT signal, thus working as a distribution amplifier of the PROGRAM OUT signal. For monitoring of the output before switching the instrument into NORMAL mode, the jumpers PP804 and PP805 should be placed as follows:

6.2.5 EXT1 Assignments

This input serves different purposes:
– EXT1 input, looped through.
– Inputs for the optional PM 8554 Linear Video Keyer: Video key and Video fill.

To provide the appropriate input configuration, looped through or 2 terminated inputs the jumpers should be placed as follows:

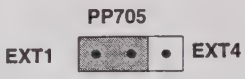




6.2.6 EXT Substitution Signal

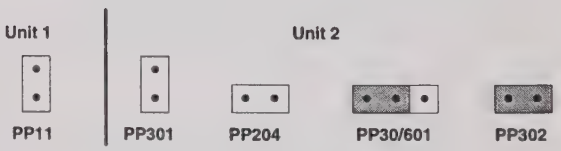
The EXT1 is normally assigned as the input for an external substitution signal, but if this input is used as a synchronization input and carriers no video, then it is possible to select EXT4 as the input for the external substitution signal.

The jumper PP705 should be located as follows:



6.2.7 Other Controls

All other plugs are only used during alignment of the generator and **must** be placed as shown below:
PP11: disables the oven for the XTAL Oscillator.
PP301: disconnects the clamp of the testsignal.
PP204: disables the clamp for external signals.
PP30 and PP302: used for filter adjustments.
PP601: reserved for internal data generator.



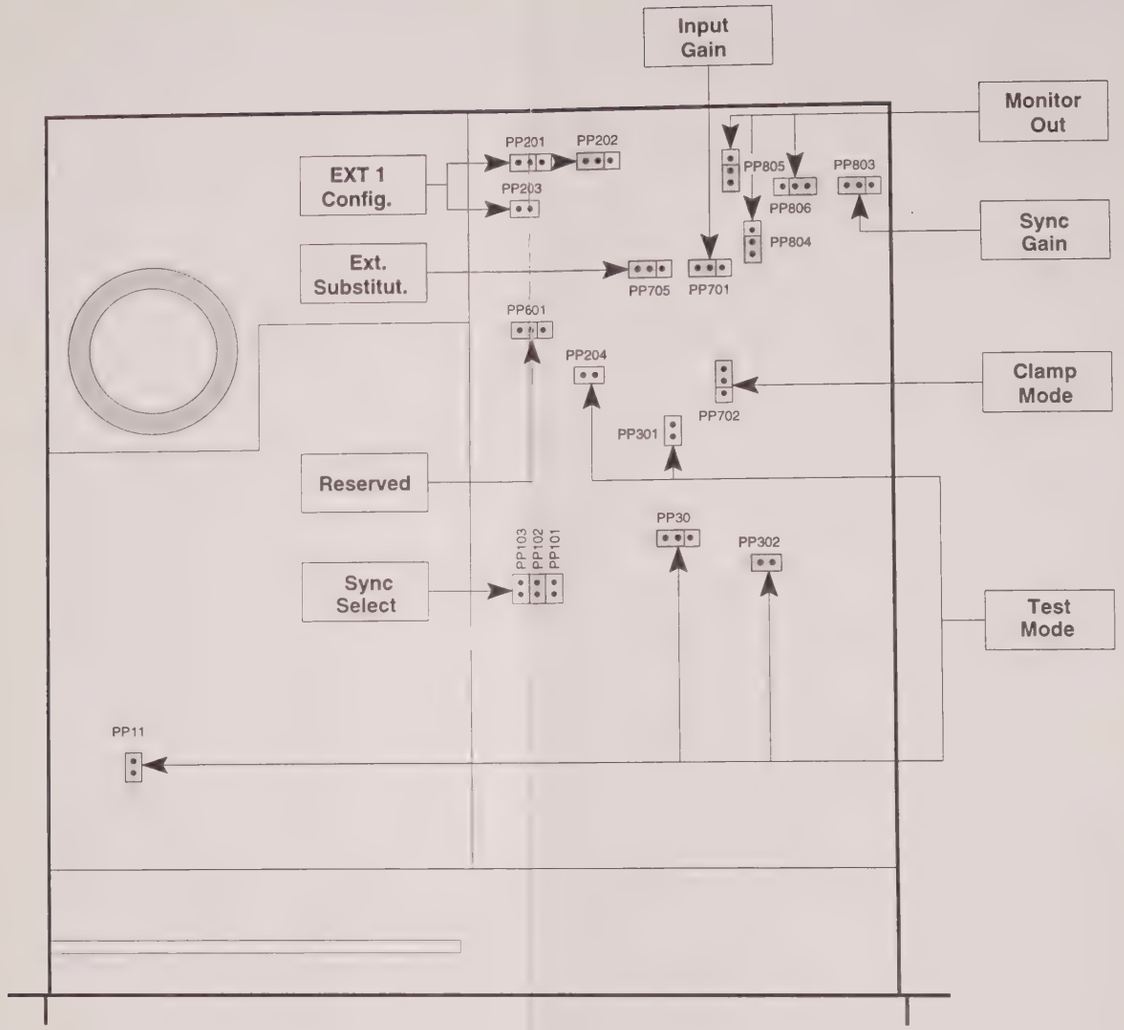


Fig. 6-1 Location of Programming Plugs

6.3 Software Configuration

The S/W configuration is primarily done in the CONFIGURATION menu, f. inst. TTL interface, IEEE, genlock phases, etc. Functions in other menus can also be regarded as configuration of the instrument.

6.3.1 Configuration Menu

CALIBRATION:
This menu is accessed when change in the subc. phase or sync genlock phase is needed.

The genlock phase adjust the insertion (and erasure) timing and the relative subcarrier phase of the inserted test signal.

In Normal mode, first adjust the horizontal timing of the inserted signal and next fine tune the delay to achieve correct subc. phasing of the signal.

In Full-field mode, the phasing adjusts the phase of burst and next the horizontal position of the sync (always correct Sc-H phase).

Default: nominal insertion timing and NTC7 Composite signal at burst phase.

BW GENLOCK:
Disable the locking to the burst and then only locks to the sync pulse.
Default: locks to burst

GENLOCK INPUT:
It is possible to configure the instrument so it will genlock to the video signal on EXT 1. The PROGRAM IN signal may in this case carry no sync or it is a scrambled signal.
Default: genlock to PROGRAM IN

IEEE INTERFACE:
The interface address for IEEE-488 control is set in this menu.
Default: address 6

ASYNC DETECTOR:
When PM 8557 is mounted this detector can be disabled.
Default: On

AUTOESC:
Enables automatic return to status menu after a time out.
Default: display returns to status menu

LCD-CONTRAST:
Adjustment is made to obtain a LCD contrast for optimal appearance.

DIAGNOSE:
Menu for check of internal communication, memory, display, and interfaces. The software version can also be recalled in this menu.

TTL CONTROL:
Below is listed all the functions available, the default configuration at delivery is listed with pin numbers.

General.
The operation of the TTL interface is either by momentary or sustained control buttons.
Note: Logic "0" is electrical high!

Fixed controls:
Will always be available regardless of the number of options mounted.

Pin no.:	Type:	Function:
1	input, sustained	Local lock out
2	input, momentary	BYPASS on
3	input, momentary	NORMAL on
4	input, momentary	FULL-FIELD on
13	output	+5V (protected against short circuit)
14	input, sustained - Note!	REMOTE enable (low=remote)
15	output, tally	BYPASS tally (low=on)
16	output, tally	NORMAL tally (low=on)
17	output, tally	FULL-FIELD tally (low=on)
24	output, tally	UNLOCKED (no ext., low=unlocked)
25	ground	

Note: For instruments with serial number lower than KU.010685, this pin is Remote tally output.

User selectable controls:
Pins 5 - 12 and 18 - 23 are in the standard instrument programmable between the following functions:

Pin no.:	Menu Text:	Func. no.:	Type:	Description:
9	Program subst off	0	input, sustained	substitute disable (electrical bypass is chosen instead)
18	VITS group bit0	1	input, sustained	VITS group select bit 0
19	VITS group bit1	2	input, sustained	VITS group select bit 1
20	VITS group bit2	3	input, sustained	VITS group select bit 2
21	Test signal bit0	4	input, sustained	test signal select, bit 0
22	Test signal bit1	5	input, sustained	test signal select, bit 1
	Test signal bit2	6	input, sustained	test signal select, bit 2
	Test signal bit3	7	input, sustained	test signal select, bit 3
	Test signal bit4	8	input, sustained	test signal select, bit 4
	Test signal bit5	9	input, sustained	test signal select, bit 5
	Internal VITS on	10	input, momentary	insert internal VITS ON.
	Internal VITS off	11	input, momentary	insert internal VITS OFF
	Ext1 VITS on	12	input, momentary	ext 1 VITS insertion ON
	Ext1 VITS off	13	input, momentary	ext 1 VITS insertion OFF
5	Ext2 VITS on	14	input, momentary	ext 2 VITS insertion ON
6	Ext2 VITS off	15	input, momentary	ext 2 VITS insertion OFF
7	Ext3 VITS on	16	input, momentary	ext 3 VITS insertion ON

Pin no.:	Menu Text:	Func. no.:	Type:	Description:
8	Ext3 VITS off	17	input, momentary	ext 3 VITS insertion OFF
	Ext4 VITS on	18	input, momentary	ext 4 VITS insertion ON
	Ext4 VITS off	19	input, momentary	ext 4 VITS insertion OFF
	Global lock out	20	input, sustained	global lock-out (GLO)
12	Program subst, tally	64	output, tally	program substitution
	Internal VITS, tally	65	output, tally	internal VITS insertion
	Ext1 VITS, tally	66	output, tally	external 1 VITS insertion
10	Ext2 VITS, tally	67	output, tally	external 2 VITS insertion
11	Ext3 VITS, tally	68	output, tally	external 3 VITS insertion
	Ext4 VITS, tally	69	output, tally	external 4 VITS insertion
	Sync regen on	21	input, sustained	insertion of new sync
	Burst regen on	22	input, sustained	insertion of new burst
23				unassigned

Mounting of options changes the default setting of the programmable pins, as some of the functions in the standard instrument are overwritten.

When the **Video Processor option** is mounted the following functions are valid:

Pin no.:	Menu Text:	Func. no.:	Type:	Description:
5	Auto regul on	24	input, momentary	automatic regulation ON
6	Auto regul off	25	input, momentary	automatic regulation OFF
	Auto regul, tally	70	output, tally	automatic regulation ON
10	Out of range, tally	71	output, tally	out of range of auto gain

When the **PM 8554 Linear Video Keyer option** is mounted the following choices are added:

Pin no.:	Menu Text:	Func. no.:	Type:	Description:
10	Video key On/Off	23	input, sustained	Video keyer off (low=off)

With the **PM 8557 Non-synchronous Signal Detector option** the following function is added:

Pin no.:	Menu Text:	Func. no.:	Type:	Description:
9	Non-synch ext, tally	72	output, tally	Non-synchr. ext. signal

6.3.2 MODE menu

This menu mainly describes how the program video signal is treated when it passes through the instrument.

BYPASS:
In case of missing input signal the instrument can be set into one of the following modes:

– Relay bypass:
Signal is relayed to the PROGRAM OUT connector

– Electric bypass:
Signal is AC-coupled and sent to the PROGRAM OUT connector without any processing.

– Substitution:
The input signal is exchanged with an internal or external signal.

– BBSubstitution:
Substitution first with a programmable time interval with black burst followed by a substitution signal.
Default: Substitution with Philips 4:3 Testpattern.

VIDEO PROCESSOR:
In this menu the operational conditions of the video processor are programmed.
– Manual or automatic regulation
– Setting of manual gain
– Hold or manual gain if reference is lost
– Position of reference signal

DELAY:
Inserts programmable delays between various states:
– Time interval when the black burst is being output.
Default: 1 s.
– Delay before the instrument returns from substitution mode to normal operation.
Default: 1 s.
– Delay before substitution takes place.
Default: 1 s.

VIDEO KEY:
PM 8554 Linear Video keyer can be disabled/ enabled in this menu.
Default: On.

SYNC SUBST:
The sync (and burst) on the program video signal can be substituted with a new sync (and burst).
Default: No substitution.

7. Operating Instructions

7.1 Front Panel Controls

Operation of the PM 5655 VITS Generator & Inserter is based on direct selection of the main functions - "BYPASS", "NORMAL" and "FULL FIELD" - by means of separate pushbuttons. To safeguard against unintended or accidental operation, keylock functions may be activated in the menus.

Configuration, setting up of advanced features/options, and operation of the test signal generator output is performed by means of menu selection. The two-lines-by-40-character LCD display, in conjunction with 4 cursor keys and an **EXECUTE** button allows easy configuration of the PM 5655 and selection of all patterns and signals.

With the cursor keys, relevant menus are called onto the display: the top line always shows the current status/selection or other current menu choices. The bottom line of the display is a menu line from which a new selection of signal or operating mode may be made.

The ▼ pushbutton allows for selection of new menus or sub-menus. The ▲ button (alone, or with cursor placed on ESC) brings about an exit from the current menu or sub-menu and a move to the next higher menu level. Using this procedure a sufficient number of times causes the display to show the status hand indicate of the instrument signal output and operating mode. The status is also shown automatically after the power-on sequence and after the control panel has not been operated for more than approx. 30 seconds.

The ◄ and ► buttons are used to perform selections along the menu line in the display (bottom line). A chosen selection or operating mode may be activated by pressing the **EXECUTE** button.

7.1.1 Description of Controls

"BYPASS"

Pressing this button activates the bypass function, which loops the program video input directly to the output. The integral red LED in the button indicates the status.

"NORMAL"

Activating this button brings the PM 5655 into its normal VITS insertion mode, where internal and external supplied signals are inserted according to the selections. The integral green LED in the button indicates the status.

The "BYPASS" and "NORMAL" buttons are operable at any time, except when a key lock has been issued. If both LEDs in these two buttons are lit, this indicates that "NORMAL" has been selected, but there is no input to lock onto.

"FULL-FIELD"

Pressing this button and then pressing the **EXECUTE** button causes the PROGRAM OUT and monitor outputs to switch to the selected internal test signal. The integral yellow LED in the button indicates when the program signal has been replaced by the test signal generator output.

The LEDs in these three buttons indicate the state of the VITS generator at any one time.

"▲","▼"," ◄ "," ► "

Pushbuttons controlling the selections in the menus. Icons in the upper right part of the display shown if they are operable.

"EXECUTE"

Confirms selection of menu parameter.

7.2 Display Information

To guide the operator through operation, symbols of the pushbuttons which can be activated at that time will appear on the right side of the display.

▲ ▼ ◄ ►	indicates which cursor key is active.
E	indicates that the EXECUTE button must be pressed to activate the required selection.
< >	indicates the position of the cursor on the menu line.
. . .	indicates that more items are available on the menu line.
	indicates that the panel is locked.
. ! .	indicates that a fault has been found during start-up diagnosis and bypassed by instrument.
ESC	to abandon changes in the menus, place the cursor on <ESC> and press ▲.
SAVE	to save a changed parameter, place the cursor on <SAVE> and press the **EXECUTE** button.

7.3 Front Panel Indicators

"ON"

A green LED that indicates when DC power is available from the internal DC supply.

"REMOTE"

A yellow LED that switches on when the instrument receives a command via the interface. The LED switches off again (instrument returns to local mode) when a button on the front panel is activated, except when Local lock-out or Global lock-out has been set.

"UNLOCKED"

The red LED switches on if an operational mode requiring external genlock has been selected without a valid synchronizing signal being present. The PM 5655 switches automatically to internal synchronization mode until a valid external signal becomes available.

7.4 Rear Panel Connections

"PROGRAM IN"

This is the normal program video input. In "NORMAL" and "FULL FIELD" modes, the video is internally AC coupled and clamped to ground. In "BYPASS" mode and if power is lost, the program video input is fed to the "PROGRAM OUT" connector.

"PROGRAM OUT"

Outputs clamped video signals from the "PROGRAM IN" connector, with internal test signals or data from an external input.

If the program video fails, the output signal may be:
– A full field test signal (with or without text) or the EXT 1 input (Configurable to EXT 4).
– An AC coupled signal from the "PROGRAM IN" connector, unclamped and without insertion.
or
If Relay Bypass has been selected:
– Signal on "PROGRAM IN" passed directly to "PROGRAM OUT".

"TEST OUT"

This output may be used for monitoring the main output program amplifier, since the signal is a direct output of this amplifier.
Note: Severe overload may have an influence on the video program signal.

"MONITOR OUT"

Outputs signals identical to "PROGRAM OUT", except in the case of power loss or failure when no signal is sent. The instrument subsequently goes into "BYPASS" operation.

"TEST SIGNAL"

Outputs a test signal or pattern selected by the user. The test signal is selected independently of the VITS insertion function, except when program substitution is active due to program loss.

"SYNC OUT"

This composite sync output locks another device onto the PM 5655, such as a teletext/caption generator, data bridge, etc. This output is coincident with the "TEST SIGNAL" output. This output is configurable, *refer to paragraph 6.2.3.*

"EXT 1A", "EXT 1B"

Are two BNC sockets providing a looped-through input facility for an external input signal. This input may be used for various purposes:

- As an input for video or data signals for insertion into the program signal.
- As input for the external substitution signal.
- As a genlock input for synchronizing the PM 5655 when the program video signal carries no sync itself.
- As inputs for the Video Keyer option (PM 8554) when "EXT 1A" is the video fill signal and "EXT 1B" is the video key signal.

"EXT 2", "EXT 3", "EXT 4"

These inputs are internally terminated and accept signals from external video sources. The four external inputs are AC coupled and clamped and are internally multiplexed for insertion into the program video. All external inputs accept signals with or without sync, burst, and video content.

"EXT 4" can be configurated as the input for the external substitution signal.

TTL CONTROL

A 25 pin male sub-D connector. This connector allows simple remote control of the PM 5655's functions (except programming). Since there are a large number of programming possibilities, only the main functions such as NORMAL, BYPASS, etc. have fixed pin assignments. All other functions are user-selectable for pin assignment. *Please see Chapter 6, Configuration for information on pin connections, and Table A.1 (Appendix A) Signal Selection.*

REMOTE

Connector for remote control of the generator (optional). The remote control facility can be supplied for the IEEE-488 and the RS232 standards. *Please see Chapter 8 for information on syntax and programming of these two interfaces.*

MAINS

The mains power connector with integrated fuse holder and voltage selector (*for selection of voltage and change of fuse, see Paragraph 5.3*).

7.5 Instrument Block Diagram

The following diagram shows the structure of the VITS generator and inserter, including the optional modules.

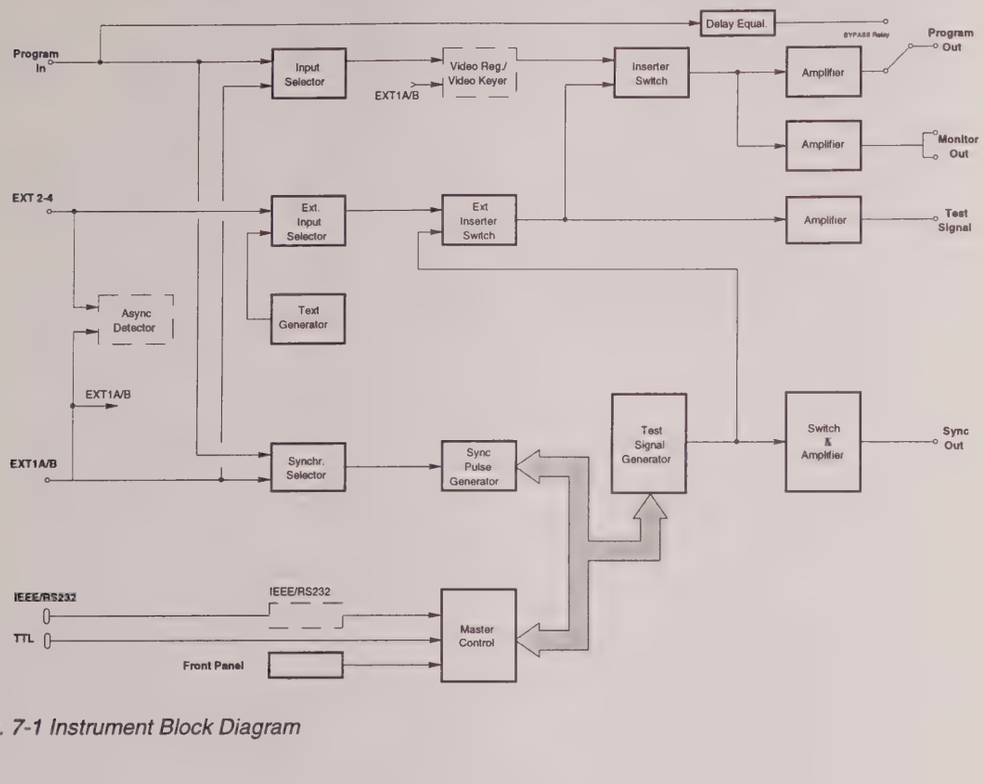


Fig. 7-1 Instrument Block Diagram

7.6 Panel Operation

7.6.1 Power Up

A diagnostic routine is performed at power on and if there is a failure a message is displayed, e.g.:

```
PM5655 Power-up diagnose . . .
Internal Test Passed
```

Please see Table A.3 for the list of errors detected during power-up.

The instrument stops if errors are detected, but may be escaped by pressing one of the buttons ▲, ▼, ◄, or ► .

If **EXECUTE** is pressed, when an error is detected then all test rutines are called up sequentially.

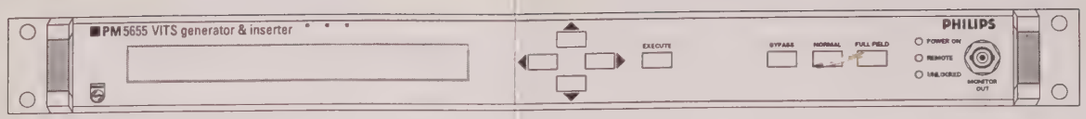


Fig. 7-2 Front of the Instrument

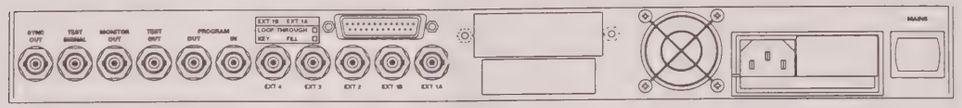


Fig. 7-3 Rear of the Instrument

After a diagnostic routine is successfully completed, the following welcome message is displayed for approximately 30 seconds:

```
PM 5655 VITS GENERATOR & INSERTER
SYSTEM: 525/60 VERSION: XXX.X
```

The version number indicates the particular hardware and software version. This number labels the software version and together with the serial no. completely identifies the instrument. Both the s/w revision number and the serial no. must be stated for efficient field service and when upgrading is necessary.

7.6.2 Status

The generator will start up in the same operating mode and with the same output signal as were present at power-down.

This menu shows the main parameters for the instrument: first line with the main modes and appropriate information and the second line with program input status, active EXTERNAL inputs, variable gain, etc.

The symbols ▼, ◄ , and ► are shown in the status display: pressing ▼ opens the top level of the menu structure and ◄ or ► scrolls the information in the second status line.

Examples of status display:

```
NORMAL, INSERTING GROUP (values 1 to 8, selected VITS group)   ◄▼►
PROGRAM INPUT (OK or LOW)                                      ■■■
```

In the case of substitution:

```
SUBSTITUTION,  PHILIPS 16:9                                    ◄▼►
PROGRAM INPUT LOW                                              ■■■
```

Selected bypass:

```
BYPASS via RELAY                                               ◄▼►
PROGRAM INPUT  (OK or LOW)                                     ■■■
```

Upon the transition to full field operation:

```
NORMAL ---> FULL FIELD                                         ◄▲►E
Press EXECUTE to confirm !
```

```
FULL FIELD,  NTC7 Composite                                    ◄▼►
PROGRAM INPUT  (OK or LOW)                                     ■■■
```

The **status** is also shown after:
- Pressing the ▲ button a sufficient number of times to exit current menu levels.
- Escaping a selections menu (select ESC) and then pressing the ▲ button a number of times.
- Approximately 60 seconds after the last pushbutton was activated (except when AUTOESC, automatic return to top level, has been deactivated).

In order to prevent accidental operation of the generator, a "Panel Lock" feature may be activated (*see PANEL LOCK below*). If this feature has been activated the display will show the same status, but a padlock icon will appear in the upper right-hand corner.

7.6.3 Menu Operation

Pressing the ▼ button in the status menu will cause the main menu to appear. This is the main entrance to all functions. If the control panel is locked, the padlock symbol will be flashing, indicating that the lock must be removed before any other operation is performed.

To exit the STATUS menu, press the ▼ button and move to the top-line menu:
(Top line from current status)

```
MENU: <VITS> TESTSIGNAL  MODE  LOCK  CONFIGURATION  TEXT
```

Select one of the menus to go onto the next menu, e.g.:

```
MENU:  VITS, select submenu                    ◄▲▼►
SUBMENU: <PROGRAM>  GROUP  SUBST
```

The menus have basically the same structure and are operated in using the same procedure.

Select one of the submenu items to:
- Make a selection in the next menu below.
- Use the arrow keys as indicated in the icon field. Also, selecting <EDIT> brings forth the next menu, where detailed programming is done.
- Select <SAVE> and press **EXECUTE** to store setting. Select <ESC> by means of the ▲ button to escape the menu.

or
- Select next the menu level, i.e. 2NDMNU.

or
- Confirm the selection by pressing **EXECUTE** (E is shown in the icon area).

Note. <SAVE> does not appear until a parameter is changed. Unintended changes are canceled by selecting <ESC> and returning to the level above.

A detailed example is worked out in the VITS submenu below: assigning signals to various groups.

7.7 Detailed Description of Menus

7.7.1 Menu: VITS

All programming regarding the insertion of internal and external signals is done in the VITS menu.

Submenu: Assignment of signals to various groups.

Groups 1-4 : Insertion lines 10-30 in field 1 and 2
Group 5 : Insertion lines 10-30 in field 1 and 2, sequential group, i.e. 4 different test lines can be assigned to one line per field
Group 6 : Insertion lines 10-30 in field 1 and 2
Group 7 : Insertion lines 10-30 in field 1 and 2
Group 8 : Insertion lines 10-252 in field 1 and 2, all lines being VITS lines.

Note: The group do not need to be active for programming.

Example for assignment:

```
<VITS>
  |_<PROGRAM>
        |__VITSGROUP<grp1>      EDIT                                    ESC
        |__VITSGROUP<grp2>      EDIT                                    ESC
        |__VITSGROUP:grp2       <EDIT>                                  ESC
                                  |___ F <1> L: 10    PASS              ESC
                                  |___ F: 1 L < 10>   PASS              ESC
                                  |___ F: 1 L < 17>   ERASE             ESC
                                  |___ F: 1 L: 17     <ERASE>           ESC
                                  |___ F: 1 L: 17     <NTC7 Composite>  SAVE   ESC
                                  |___ F: 1 L: 17      NTC7 Composite  <SAVE>  ESC
                                  |___ F: 1 L: 17      NTC7 Composite   SAVE   <ESC>
                                  |___ F: 1 L: 16     <External 2> Std
                                  |___ F: 1 L: 16      External 2 <WIDE> SAVE  ESC
```

Explanation:

1. From the STATUS menu press the ▼ (and ◄ or ►) buttons to reach the VITS menu.
2. In the VITS menu select PROGRAM by using the ◄ or ► buttons and descend to the next level by pressing the ▼ button.
3. Select the group to be modified using the ▼ or ▲ buttons.
4. Move cursor to EDIT and press ▼ . The bottom line now shows the field and line number and the signal assigned to it. Select field using ▲ or ▼ and next move the cursor to LINE to modify . Press ▲ or ▼ to scan through programmable TV - lines.
5. To change the assignment, move the cursor to signal and change to the required type by pressing ▲ or ▼ . When the assignment is changed, the SAVE message pops up.
6. The external inputs can be inserted in the Standard (Std) insertion interval or in a Wider (Wide), see 3.4.4. Move the cursor to attribut and select by using ▲ or ▼.
7. Move cursor to SAVE to store the new assignment and press **EXECUTE** .
8. To abandon changes, move cursor to ESC and press ▲ .

Note: Programming of Ghost Signal on line in one field will automatically allocate the Ghost on the corresponding line in the other fields. The Ghost line have to be overwritten/cleared independently.

For a complete list of available VITS signals, please see signal listing table A.1 (Appendix A).

Submenu: Making a VITS group active.

```
<VITS>
   |_<GROUP>
         |__VITSGROUP<grp1>                          (SAVE)    ESC
```

– Select the group by means of the ▲ and ▼ buttons.
– Select SAVE to activate the group and the menu returns to next level up.

The variable string has the following values:

Grp1 to Grp4,	
Grp6 and Grp7	: Group 1, 2, 3, 4, 6, and 7 are standard groups.
Grp5=2Frame	: Group 5 is programmed in 4 fields for field sequential generation of VITS.
Grp8=All lines	: Group 8 may have full TV line programmed (lines 10-252 in field 1 and 2).
<DISABLED>	: Local insertion cancelled.

Submenu: Selection of substitution signal (stand-by).

To safeguard against a missing videosignal at the input of a transmitter, for example a substitute signal may be sent. This signal may also carry embedded text information.

```
<VITS>
   |_<SUBST>
         |__<SIGNALS>
               |___SELECT<NTC7 Composite>            (SAVE)    ESC

         |__<PATTERNS>
               |___SELECT<PHILIPS 4:3>               (SAVE)    ESC
```

– Move the cursor by means of ◄ , ► and/or ▼ until either SIGNALS or PATTERNS is enclosed by the cursor.
– Pressing ▼ opens the programming line in which the variable string is the signal name for the substitution signal.
– When the required signal is found, move the cursor to SAVE and press **EXECUTE** .
– Moving the cursor to ESC and pressing ▲ to avoid selection.

For a complete list of available substitution signals, please see signal listing table A.1 (Appendix A).

7.7.2 Menu: MODE

This menu covers almost all the operational parameters that can be set - up for controlling the program path from PROGRAM IN to PROGRAM OUT.

Submenu: Selection of BYPASS mode if the input signal is missing.

```
<MODE>
   |_<BYPASS>
         |__PROGRAM LOSS <Relay Bypass>                    (SAVE)    ESC
```

The following condition parameters are selectable:

Relay Bypass	: The program signal is relayed via passive circuitry to PROGRAM OUT.
Electric Bypass	: The program signal is AC-coupled and fed to PROGRAM OUT via the output amplifier.
Substitution	: The program signal is replaced by an internal or external signal (EXT 1).
BB Substitution	: The program signal is replaced first by a Black Burst signal for a programmable length of time, and then afterwards by the selected substitution signal.

Note: All vertical interval signals are erased when the intermediate Black Burst is output.

Submenu: Operation of the Video Processor PM 8555

The Video Processor has the following main functions:

Restoration	: Of video level, either manually or automatically, by measurement of the white in VITS signal, i.e. NTC7 Composite.
White clip	: Limits the luminance amplitude to nominal 714mV video. Limiter acts after video regulation.
Loss of reference	: Will cause the regulation to be sustained until the reference signal appears again. Alternatively, the video signal may be exposed to a predetermined amplification.

```
<MODE>
   |_<VIDEO PROCESSOR>
         |__<REGULATION>
         |       |___GAIN<manual>        1.41              (SAVE)    ESC
         |__<REFERENCE>
         |       |___F <1> L:  10        POS: 6uS          (SAVE)    ESC
         |       |___F: 1   L <10>       POS: 6uS          (SAVE)    ESC
         |__<REF LOSS>
                 |___REF LOSS<manual >                     (SAVE)    ESC
```

The following selections are possible in the variable parameters below:

Regulation:

GAIN <*parameter*> : *Manual* or *Auto*
If *Manual* is selected, the second parameter in the line represents the selected gain (0.76-1.42).

Reference:

F <*parameter*> : Field 1 or 2 for reference signal.

L <*parameter*> : Line no. 10-20; one line from each field, or DISABLED for selected field.

POS <*parameter*> : Selects the position (0-51µs with reference to start of active line) for the 1µs wide sampling interval for the reference.

Reference loss:

GAIN <*parameter*> : *Hold* keeps the gain immediately before reference loss,
Manual restores the manually preadjusted level.

The white clip is adjustable by means of the potentiometer R22 on the unit.

The white clip function is installed permanently, to inhibit clipping the level can be set to maximum level.

Submenu: Programming of delays in transition.

Delayed substitution and return of the program signal is programmable, providing measures to avoid unwanted interruption of a fluctating program signal.

<MODE>
|_<DELAY>
|__DELAY< To Normal *1*> 1sec *(SAVE)* ESC

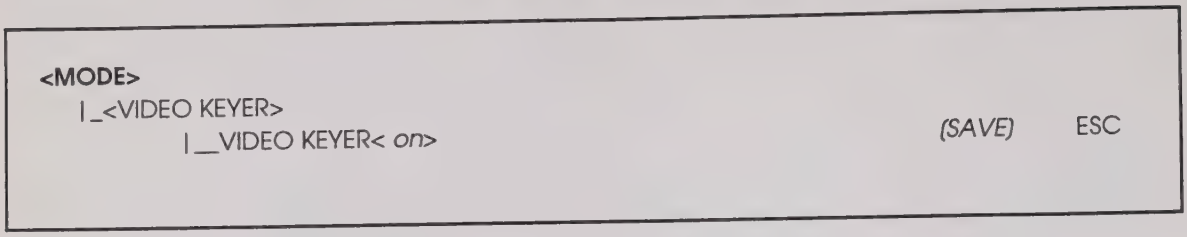
Note: All vertical interval signals are erased as long as the intermediate Black Burst is output.

DELAY <*parameter*> : To Normal
To Substitute
To BB Substitute

<*parameter*> sec. : 0-20sec. can be programmed.
Note: 0sec. is not instant switching, but takes less than 1sec.
(typically 0.5sec.)

Submenu: Video Keyer (PM 8554), External Keying

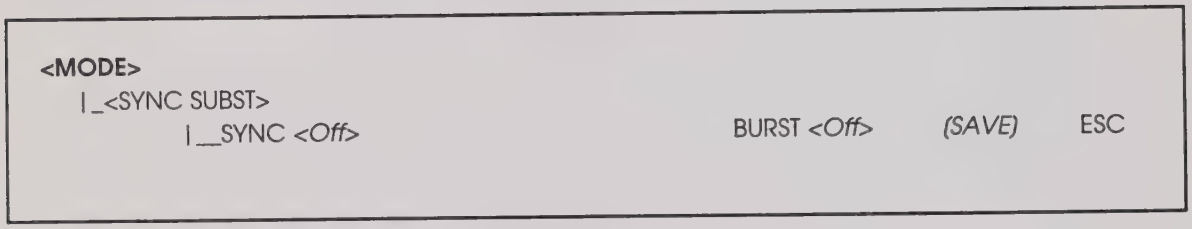
The optional Video Keyer in the program video path is configurable to either On or Of mode.



- Move the cursor down the menu tree to VIDEO KEYER.
- Press buttons ▲ or ▼ to select *On* or *Off*;
- Then move the cursor to SAVE and press **EXECUTE** .
- To discontinue programming move cursor to ESC and press ▲ .

Submenu: Substitution of program sync.

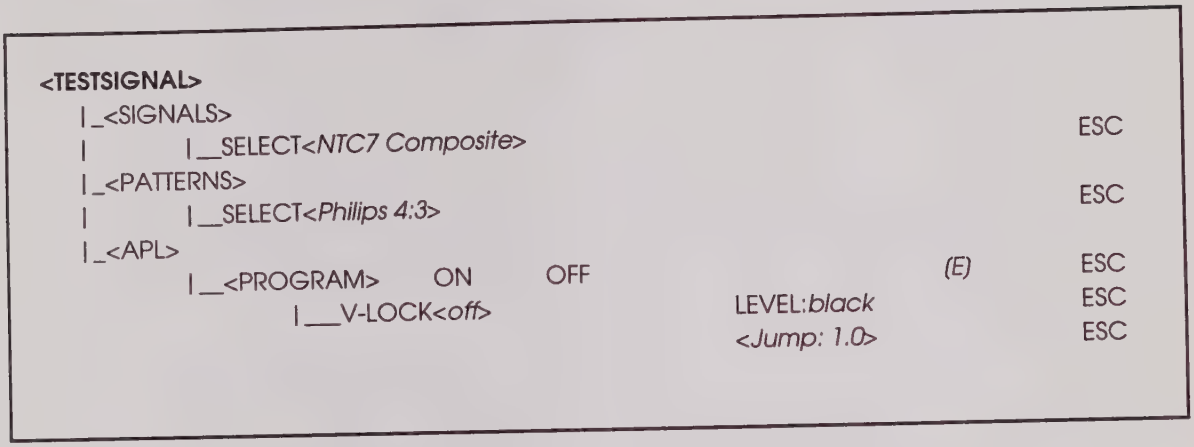
The sync of the program signal is exchangeable with the internally generated sync. The substitution is default programmed in the Off mode.



- Move the cursor down the menu tree to SYNC SUBST.
- Select item to change, using ◄ or ► .
- Press ▲ or ▼ to select *On* or *Off*;
- Then move the cursor to SAVE and press **EXECUTE** .
- To discontinue programming, move the cursor to ESC and press ▲ .

7.7.3 Menu: TESTSIGNAL

This main menu covers 3 submenus:
– Selection of testsignals,
– Testpatterns, and
– Selection and programming of APL
For a complete list of testsignals and pattern, please see table A.1 (Appendix A).



SIGNALS and PATTERNS are selected in the same manner:
– Select type, use ▲ or ▼ to change the signal and subsequently a SAVE message appears.
– To call the signal either:
press **EXECUTE**
or
place the cursor on SAVE (use ◄ or ►) and press **EXECUTE** .

The APL function is (de)-activated by placing the cursor on OFF or ON and then pressing the **EXECUTE** button.

V-LOCK : This parameter sets the duty sequence either in locked or unlocked to field using the buttons ▲ or ▼. Store the mode or continue programming of the other duty functions.

LEVEL : This parameter describes the amplitudes for the intervening lines in the APL signal and has following values:
Black, Grey, White and Jump *[rate]*.
The Bounce signal jumps between black and white at a rate of 0.1 - 25 seconds.

7.7.4 Menu: LOCK

This menu serves for safeguarding the instrument against non-intended operation.

<LOCK>

I_<*Panel - lock*	<	>	<*Off*>	(*SAVE*) ESC
Global - lock out			<*Off*>	
Group 8 - lock			<*On*>	
Vits Prog - lock			<*On*>	

– First, select the function to lock and unlock using ▼ and ▲ keys.
– Next move the cursor to the value field (On/Off) and press ▼ or ▲ to change.
– Then the SAVE message is added to the display.
– Next place the cursor on SAVE and press **EXECUTE** to store and activate the function.
– Cancel changes by placing cursor on ESC and press ▲.

PANEL-LOCK : Prevents accidental operation of the generator: several keys must be pressed before any other operation can take place.

GLOBAL LOCK OUT : Global lock out prohibits control of the instrument via the front plate and the TTL control.

GROUP 8 LOCK : This lock prevents programming of VITS group 8, which is able to insert in any line, also in the active picture.

VITS PROGRAM LOCK : This lock prevents programming of all VITS tables, but viewing of assgned lines is still available.

7.7.5 Menu: CONFIGURATION

Submenu: CALIBRATION of subcarrier and genlock phase.

This CALIBRATION submenu is used to control and adjust the subcarrier phase of the inserted test signal and the genlock phase in the full field mode.

The phase is conveniently adjusted in two steps: **Coarse** and **Fine**.

Coarse adjustment operates in steps of 17ns (or 22.5°) and the fine adjustment divides a coarse step into 64 steps: the resultant resolution is aproximately 0.3ns.

The adjustment is carried out by means of the ▲ and ▼ keys. Holding one of the keys down will cause the phase to increment or decrement automatically. A bargraph illustrates the adjustment range available.

– Move the cursor down the menu tree to CALIBRATION and further down to or GENLOCK COARSE/FINE.
– Press buttons ▲ or ▼ to adjust the phases, and when the desired result has been obtained move the cursor to SAVE and press **EXECUTE**.
– To discontinue adjustment, move the cursor to ESC and press ▲.

```
<CONFIGURATION>
   |_<CALIBRATION>
         |__<GENLOCK>
               |___<COARSE>
               |       |____|.....##|..  ...|          (SAVE)   ESC
               |___<FINE>
                       |____|########.....|            (SAVE)   ESC
```

Submenu: Selection of genlock modes.

Normally the genlock function automatically locks onto the burst and sync information. If the incoming signal is BI/Wh, it only locks onto the sync. For non-standard signals the genlock function is programmable to the sync only (black/white synchr.).

For program signals without sync or scrambled signals, the EXT1 loop-through is programmable as an input for the synchronization process.

```
<CONFIGURATION>
   |_BW GENLOCK
         |__ BLACK/WHITE SYNCHR. <Off>                (SAVE)   ESC
   |_<GENLOCK INPUT>
         |__ SYNCHR. to <Program IN>                  (SAVE)   ESC
```

SYNCHR. to <*parameter*> : Pogram Input
External 1

– Move the cursor down the menu tree to the required function.
– Press buttons ▲ or ▼ to select ON or OFF.
– Then move the cursor to SAVE and press **EXECUTE** .
– To discontinue programming move the cursor to ESC and press ▲ .

Submenus: TTL Interface and IEEE-488 address settings (Option PM 8551).

The TTL interface can be used to control and monitor many of the functions in the instrument. This menu enables a sub-set to be selected from among all controllable functions.

```
<CONFIGURATION>
   |_<TTL INTERF>
   |        |__PIN< 5>                    Ext 2 VITS  ON     (SAVE)    ESC
   |_<IEEE INTERF>
            |__ADDRESS <  7>                                 (SAVE)    ESC
```

The IEEE-488 address setting is selected in the menu below (addresses range between 0 and 30 by means of software or "Internal switches").

- Move the cursor down the menu tree to the required function.
- Press ▲ or ▼ to select among the assignable values for the first field and continue on to next field (only TTL interface), assigning a (new) string value.
  Please refer to Chapter 6, Configuration for complete listing.
- To store the required assignment, move the cursor to SAVE and press **EXECUTE** .
- To discontinue programming move the cursor to ESC and press ▲.

Note: To activate the internal switches, the instrument has to be switched off and subsequently on.

Submenu: Configuration of NON.SYNC DETECTORs (Option PM 8557).

The detector prevents the insertion of non-synchronous external signals, and is programmable to On/Off.

```
<CONFIGURATION>
   |_<ASYNC.DETECT>
            |__ ASYNC. DET <External 1>          ON          (SAVE)    ESC
```

- Move the cursor down the menu tree to ASYNC DETECT submenu.
- Select which of the external inputs to be supervised, pressing buttons ▲ or ▼ to choose between *External 1* to *External 4*.
- Next move the cursor to the right: use buttons ▲ or ▼ to select the *On* or *Off* conditions for that input.
- Finally move the cursor to SAVE and press **EXECUTE** .
- To discontinue programming move cursor to ESC and press button ▲.

Note: Missing input is detected as a non-synchronous signal.

Submenu: LCD contrast and STATUS return.

The automatic return to the top STATUS menu after 60seconds can be disabled in this menu.

```
<CONFIGURATION>
   |_<AUTO ESC>
   |        |__AUTO RETURN TO STATUS <On>          (SAVE)    ESC
   |_<LCD CONTRAST>
            |__ADJUST: | ##############____|
```

The contrast is adjustable to provide optimum readability for the wieving angle.

- Move the cursor down the menu tree to AUTO ESC.
- Press ▲ or ▼ to select *On* or *Off*.
- Then move the cursor to SAVE and press **EXECUTE** .
- To discontinue programming move the cursor to ESC and press ▲.

- The contrast is adjusted by means of the ▲ and ▼ keys; a bar graph indicates the range and settings available.
- Move the cursor to ESC and press ▲ to leave this menu.

Submenu: Diagnostic.

Contains test options for communications within the instrument (**Comm**), a test of the memory (**Memory**) and a test of the display (**Display**).

```
<CONFIGURATION>
   |_<DIAGNOSE>
            |__<Comm>
               Memory
               Display
               Interface
               Version
```

- To execute a test, move the cursor down the menu tree to the test in question and then press the **EXECUTE** .
- The test will now run continuously until it is interrupted by pressing ▲.
- Then selecting VERSION TV-system and version identification appears on the display.

Error codes will indicate nature of failures, refer to table A3 (Appendix A).

7.7.6 Menu: TEXT

```
<TEXT>
  |__<EDIT>
  |       |__PAGE< 1> CLEAR   EDIT                                        ESC
  |       |__PAGE: 2   CLEAR <EDIT>                                       ESC
  |                          |___<11>    Textstring 11        CLR         ESC
  |                          |___< 9>    Textstring 9         CLR         ESC
  |                          |___  9     <New text.9>         CLR         ESC
  |                          |___  9     <New text.9>         <SAVE>      ESC
  |__<PAGE>
  |       |__PAGE< 1>                                           (SAVE)      ESC
  |__<COPY>
          |__FROM PAGE< 1> TO PAGE:2                            (SAVE)      ESC
```

The maximum number of text pages is 16.

Disabling of text: select PAGE, use buttons ▲ and ▼ and change to *Disabled*.

The text editor is line based: maximum 16 lines of 24 characters each. Text is limited to a maximum of 140 characters, including the text in the Vertical Interval.

Submenu: EDIT text

In the next level it is possible to:
- Select text page to CLEAR, removing all text lines.
- EDIT text page for creation/modification of the invidual text lines.

The structure of the editing line is:
<line no.> <text string> <control> ESC

Description of fields:

Line no.	: 1 to 12 and VI (Vertical Interval text).
Textstring	: Characterset as shown in table A.2 (Appendix A)
Control	: CLeaR, INSert, DELete and SAVE. These commands clear, insert, delete, or save a text line.

Creating/editing a text line:
- Select text page 1-16.
- Then place the cursor on EDIT and press ▼ . This opens the editing menu.
- Select the line to be edited by pressing ▲ or ▼ .
- The cursor is placed on the *textstring* and press **EXECUTE** to enable the editing.
  The ▲ and ▼ buttons are used to select characters; ◄ and ► move the cursor along the text line.
  The SAVE appears when characters are added or changed.
- When editing is finished, press **EXECUTE** to exit the text string editor.

– Place the cursor on the *control* field, when SAVE is shown, and press **EXECUTE** to save (or clear) the text string.
– Continue with the next line of text.

Inserting a text line:
– Select text line to be preceded by a new line and move the cursor to the control field.
– Using ▲ and ▼ select INS.
– Then press the **EXECUTE** button.
– A new blank text line is has been now inserted.

Deleting/clearing a text line:
– Select text line to be deleted or cleared and move the cursor to the control field.
– Using ▲ and ▼ select DEL to delete line, and CLR to clear line.
– Then press the **EXECUTE** button.
– The text line has now been deleted/cleared.

Copying a text page:
– In the COPY submenu, use buttons ▲ and ▼ to select page to copy from.
– Move buttons ◄ or ► to page to copy to, and using ▲ and ▼ select the destination page.
– Finally place cursor on COPY and press **EXECUTE** .

```
<VITS>
    |_<PROGRAM>
    |       |__VITSGROUP<grp1>        EDIT
    |       |__VITSGROUP: grp1        <EDIT>
    |_<GROUP>
    |       |__VITSGROUP<grp1>
    |_<SUBST>
            |__<SIGNALS>
            |       |___SELECT<NTC7 Composite>
            |__<PATTERNS>
                    |___SELECT<Philips 4:3>


<MODE>
    |_BYPASS>
    |       |__<RELAY>
    |       |__<ELECTRIC>
    |       |__<SUBSTITUTE>
    |       |__<BLACK BURST SUBST>
    |_<VIDEO PROCESSOR>
    |       |__<REGULATION>
    |       |       |___REGULATION<manual>
    |       |__<REFERENCE>
    |       |       |___F:1 L< 14>      POS: 22uS
    |       |__<REFERENCE LOSS>
    |               |___GAIN<manual>
    |_<DELAY>
    |       |__DELAY<To Normal> 1sec
    |_<VIDEO KEYER>
    |               |___VIDEO KEYER< On>
    |_<SYNC SUBST>
            |__SYNC<OFF>  BURST:OFF


<LOCK>
    |_Panel Lock            Off
    |_Global Lock Out       Off
    |_Group 8 Lock          On
    |_VITS Prog Lock        On


<TESTSIGNAL>
    |_<SIGNALS>
    |       |__SELECT<NTC7 Composite>
    |_<PATTERNS>
    |       |__SELECT<Philips 4:3>
    |_<APL>
            |__<PROGRAM>  ON   OFF
                    |___V-LOCK<on>    LEVEL:black
```

```
<CONFIGURATION>
    |_<CALIBRATION>
    |       |__<GENLOCK PHASE>
    |               |___<COARSE>
    |               |___<FINE>
    |_<BW GENL>
    |_<GENLOCK INPUT>
    |_<TTL INTERFACE>
    |       |__PIN< 5>              VITS group bit0
    |_<IEEE INTERFACE>
    |       |__ADDRESS<  1>
    |_<ASYNC.DETECTOR>
    |       |__ASYNC DET<External 1>
    |_<AUTOESC>
    |       |__AUTO RETURN TO STATUS<Off>
    |_<LCD-CONTRAST>
    |       |__ADJUST:I##_____________I
    |_<DIAGNOSE>
            |__<Comm>
            |__<Memory>
            |__<Display>
            |__<Interface>
            |__<Version>


<TEXT>
|_<EDIT>
|       |__PAGE<  1>          CLEAR  EDIT
|_<PAGE>
|       |__PAGE<  2>
|_<COPY>
        |__FROM PAGE<  1> TO PAGE:1  COPY
```

Fig. 7-4 Menus tree

8. Remote Control

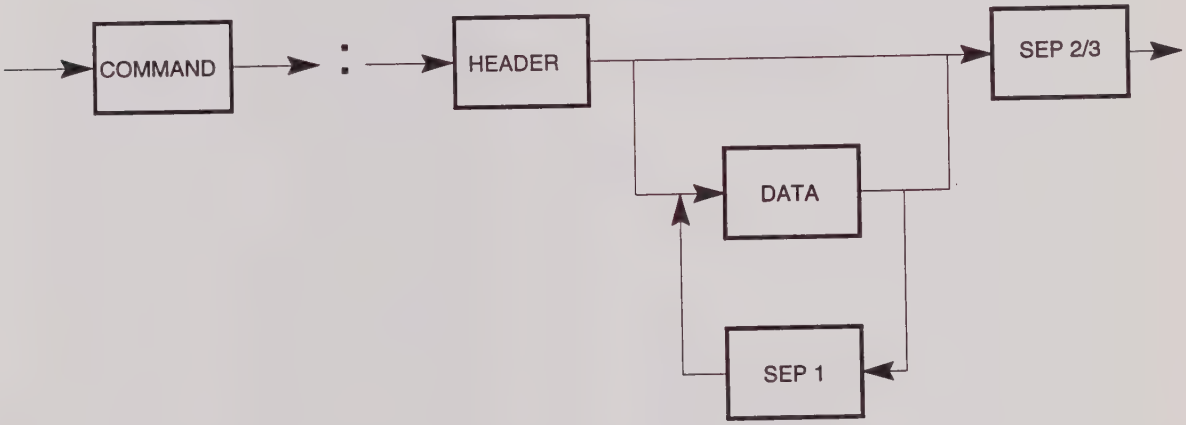
8.1 Programming Syntax

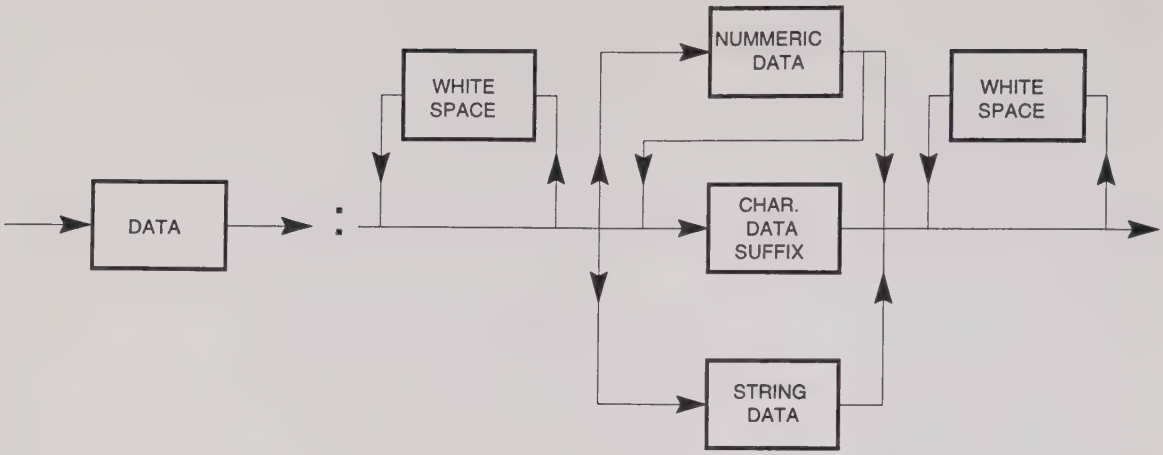
Commands for programming the instrument consist as a minimum of a "HEADER" and a "Message Terminator".

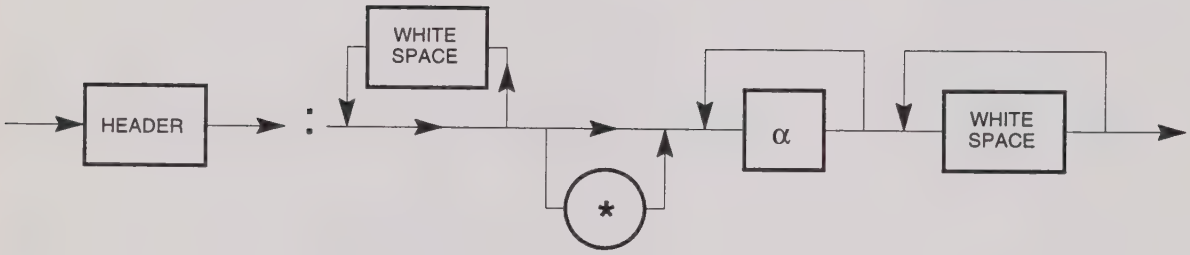
Most commands accept one or more data elements to form the complete command.

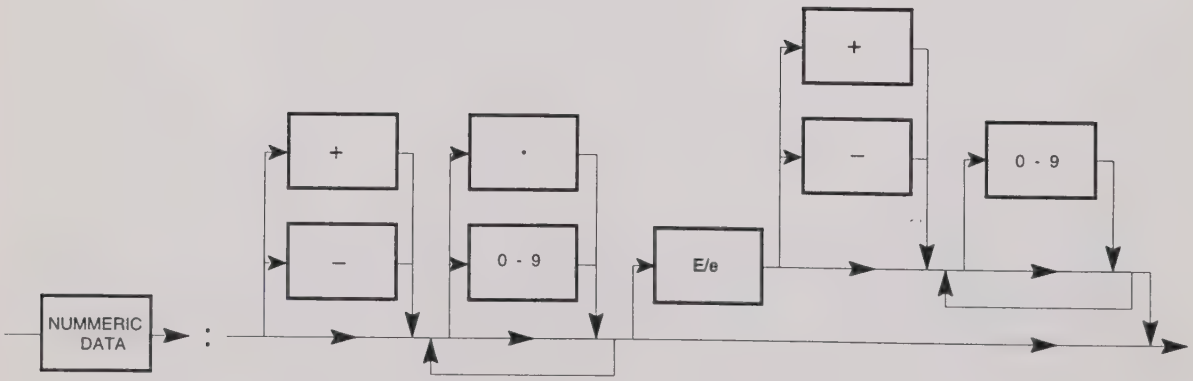
A Query form is allowed for most commands fro returning programmed and measured data.

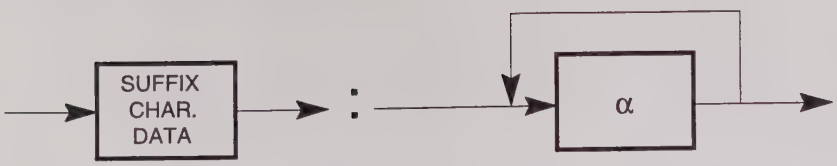
The are 3 different types of programming data:
- Nummeric Data,
- Character Data, and
- String Data.



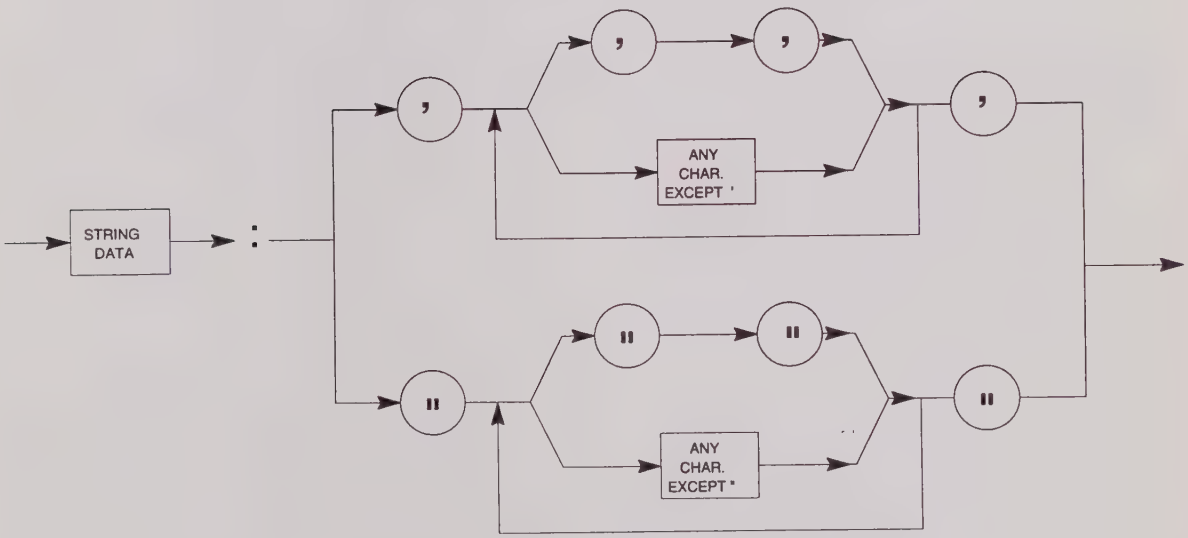

DATA
:
WHITE SPACE
NUMMERIC DATA
CHAR. DATA SUFFIX
STRING DATA
WHITE SPACE

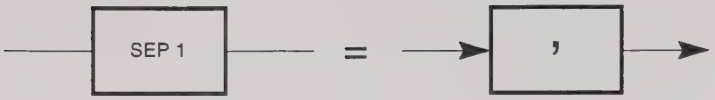

HEADER
:
WHITE SPACE
*
α
WHITE SPACE

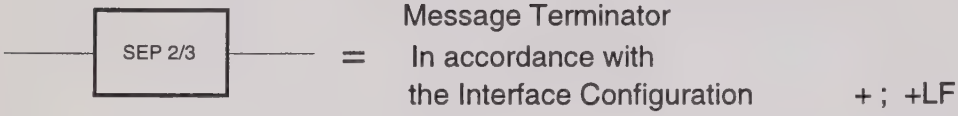

NUMMERIC DATA
:
+
–
.
0 - 9
E/e
+
–
0 - 9

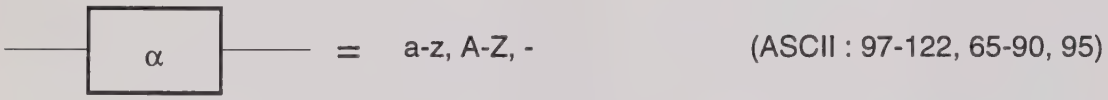

SUFFIX
CHAR.
DATA
:
α

WHITE
SPACE
:
ASCII 32
or <32
except
ASCII=10


STRING
DATA
:
'
'
'
'
ANY
CHAR.
EXCEPT '
"
"
"
"
ANY
CHAR.
EXCEPT "







All instrument programming commands are listed in a table with the following information:

HEADER with alternative spellings, **DATA** with limits, resolution etc., for Nummeric Data the default **SUFFIX** in () and other suffixes. And the format of **RETURN**ed data is shown.

The interface can provide an idenfication of the device in which it is installed.

Device Indentification

HEADER	DATA	SUFFIX	RETURNS
ID *IDN	None		"Philips, PMXXXX/XXX,0,Z.Z,eos"

Note: XXXX/XXX : Instrument Indentification.
Z.Z : Software version.
eos : Valid output seperator(s).

8.2 IEEE Operation

8.2.1 Hardware Configuration

The interface comes with a 24-pin female AMPHENOL connector that complies with the IEEE-488 standard. If your controller cabling is of the IEC-625 type, connection can be made using the IEEE to IEC adapter PM 9483/50 (to be ordered separately, not included as accessory).

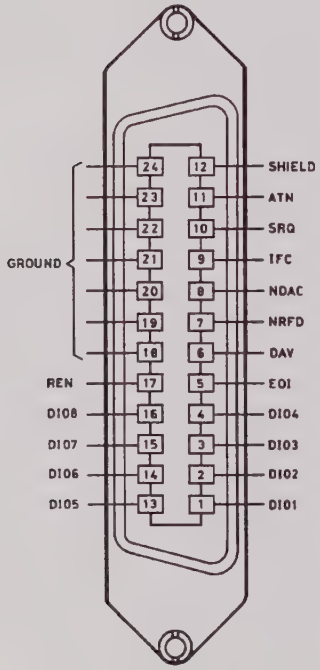


Fig. 8-1 Connector pin-out, IEEE

The hardware configurationals include:
- Device address
- Interface mode
- Shielding

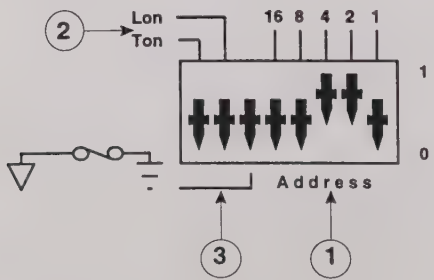


Fig. 8-2 Hardware programming, SW1

1:

The device address is set using the five decimal weighted switches. All address settings except "31" and the "[controllers address]" are acceptable (standard factory setting is "6").

Example:

	16	8	4	2	1
0	X	X			X
1			X	X	

Address = 4 + 2 = 6

2:

Mode Switches

Lon	Ton	Mode
0	0	Addressable mode (*standard factory setting*)
0	1	Talk only
1	0	Listen only

3:

Logic 0 may be disconnected from the shielding in order to eliminate unwanted currents.

Switch position	Shield condition
0	Logic "0" connected (*standard factory setting*)
1	Logic "0" disconnected

8.2.2 Interface programming

The IEEE remote interface can via the controller be configured with regard to:
- Record separator
- Service request mask

Furthermore, it can provide 'device indification'. The programming of the interface must follow the syntax illustrated on page 8-1.

Note: When programming the interface, before every header/body combination, the listen address of the interface must be send (MLA).

1. Separator programming

The interface can be programmed to accept single and double separators. At power on the single separator "LF" is default setting (ISO code 10). When the interface sends data to the controller, the data stream is concluded with the programmed separator(s), and the EOI line is activated concurrent with the transmission of the (last) separator.

Definition of record separator(s).

HEADER	DATA	SUFFIX	RETURNS
SPR	n1 (,n2) Separator 1 : n1 Separator 2 : n2 n1 and n2 are the decimal quivalent (ISO code) of the desired separator(s). ESC (ISO 27) is not allowed as separator. Default separator at power on is "LF" (ISO 10).	none	

Table 8-1 Programming, separator(s)

Example:

a) "SPR 03" defines "ETX" as input/output separator.

b) "SPR 13, 10" defines the sequence "CR LF" as input/output separator.

2. Service request mask

The interface can be programmed to request service for one or more of the conditions that are reflected in the status byte.

Bit	Condition
7	EXT
6	RQS
5	AB
4	BSY
3	EF3
2	EF2
1	EF1
0	EF0

Table 8-2 Status byte

EXT:

not used

RQS:

service request

AB:

Abnormal condition

AB	
0	Normal (no error)
1	Abnormal (error condition as specified by EF0-EF3))

BSY:
Busy

EF0-EF3:
Message flags

AB	EF3-EF0	Dec.	Message
0	0001	1	Message string available
1	1100	12	Number error
1	1101	13	Execute error
1	1110	14	Head/suffix error
1	1111	15	Syntax error

Table 8-3 Message flags EF0-EF3

At power on all service requests are masked (disabled). Thus, if an error condition occurs, no service request will be generated. The instrument status can, however, always be checked by reading the status byte via a serial poll. The service request facility can be enabled for the following qualifying conditions:

Qualifying condition	Decimal equivalent
EF0 changed from 0 to 1 and AB=0 (DAV)	1
EF1 changed and AB=0 (not used)	2
EF2 changed and AB=0 (not used)	4
EF3 changed and AB=0 (not used)	8
EF0 changed from 0 to 1 and AB=1	16
EF1 changed from 0 to 1 and AB=1	32
EF2 changed from 0 to 1 and AB=1	64
EF3 changed from 0 to 1 and AB=1	128
BUSY changed from 1 to 0	256

Table 8-4 Qualifying conditions

At the generation of a service request the RQS bit will be set and the SRQ line activated. RQS and SRQ are reset again, when the controller polls the status byte. To specify one or more qualifying conditions, the decimal equivalent of the condition(s) must be send to the interface using the MSR command ("MSR 0" masks (disables) all interupts):

Definition of service request mask

HEADER	DATA	SUFFIX	RETURNS
MSR	n Mask : n = [0 - 511]	none	

Table 8-5 Programming, service request mask

Example 1:
The interface shall request service for 'data available' only. The mask bit for 'data available' has the decimal value "1". The resulting command is "MSR 1".

Example 2:
The interface shall request service for 'data available' and for all the possible error conditions reflected by the error flags EF3-EF0. The EF3 bit be active in all four possible error conditions. The decimal value for the desired qualifying conditions is 129 (128+1) as shown in table 6-6. The resulting command is "MSR 129".

Note: The status byte can not simultaneously indicate conditions related to AB=0 (normal) and AB=1 (abnormal). The various combinations available, result in four possible service request/serial poll sequences:

a) All service request qualifyers are masked (disabled):
The first serial poll will show the error flags EF3-EF0 for the abnormal condition (if one exists). At the following serial poll, the AB bit will be cleared and the 'normal' status is indicated by EF3-EF0.

b) One or more AB=1 conditions are enabled. All AB=0 conditions are masked (disabled): If the enabled Abnormal condition qualifyer occurs, a service request is generated and the abnormal condition is indicated in the status byte.

c) All AB=1 conditions are masked (disabled). One ore more AB=0 conditions are enabled: If the enabled 'normal' condition qualifyer occurs, a service request is generated. The first serial poll will show the error flags EF3-EF0 for the 'normal' condition that caused the service request. A following serial poll will set AB to 1 and indicate the 'abnormal' status.

d) Some or all 'normal' and 'abnormal' qualifying conditions are enabled: If the enabled 'abnormal' condition occurs, a service request is generated and the reason is indicated in the status byte. If the enabled 'normal' condition occurs a service request will be generated and the reason is indicated in the status byte. However, if an 'abnormal' condition occurs before the pending 'normal' request is polled, the 'abnormal' condition will be indicated in the status byte (the reason for the 'normal' condition is lost!!!).

8.3 RS232/V24 Operation

8.3.1 Hardware Configuration

The interface comes with a 9-pin male D-connector, that via a DB-9 female to DB-25 male adapter, complies with the RS232(EIA)- and the V24 (CCITT) standard.

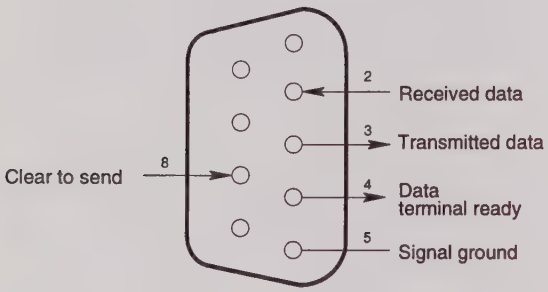


Fig. 8-3 Connector pin-out, RS232/V24

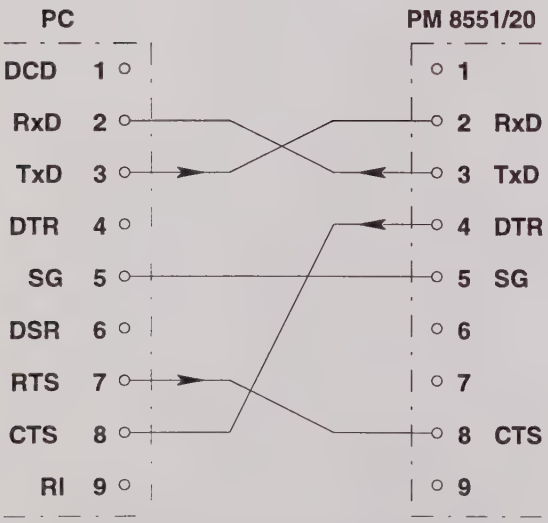


Fig. 8-4 Configuration of cable between PC and PM 8551/20.

The hardware configurationals include:
Communication settings:
- Baud rate
- Character length
- Parity selection
- Handshake

1. Communication settings:

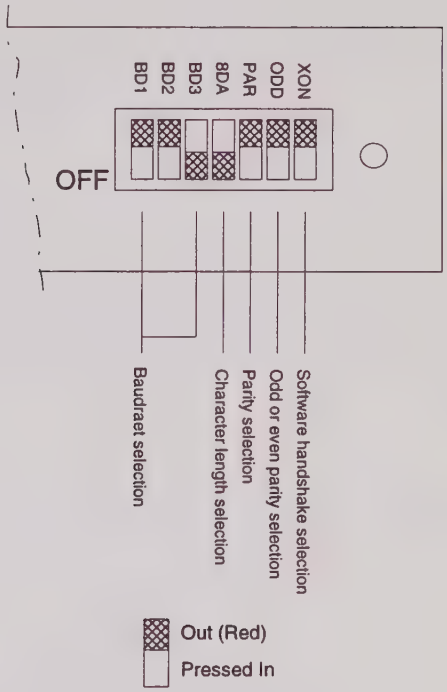


Fig. 8-5 Communication setting, SW1

BD1	BD2	BD3	Baudrate
off	off	off	110
on	off	off	150
off	on	offf	300
on	on	off	600
off	**off**	**on**	**1200**
on	off	on	2400
off	on	on	4800
on	on	on	9600

Table 8-6 Baudrate setting

SWITCH	FUNCTION
8DA	**on : 8 data bits character length** off : 7 data bits character length
PAR	on : Parity on **off : Parity off**
ODD	on : Odd parity **off : Even parity**
XON	on : Xon/Xoff handshake on **off : Xon/Xoff handshake off**

Table 8-7 Character length, Parity and Handshake setting.

Bold = Standard Factory Setting

8.3.2 Interface Programming

The RS232/V24 remote interface can via the controller be configured with regard to:
– Record separator

Furthermore, it can run a number of 'Escape functions'.

The programming of the interface must follow the syntax illustrated on page 8-1.

1. Separator programming

The interface can be programmed to accept single and double separators. At power on the singel separator "LF" is default setting (ISO code 10). When the interface sends data to the controller, the data stream is concluded with the programmed separator(s).

Definition of record separator(s).

HEADER	DATA	SUFFIX	RETURNS
SPR	n1 (,n2) Separator 1 : n1 Separator 2 : n2 n1 and n2 are the decimal quivalent (ISO code) of the desired separator(s). ESC (ISO 27), ETX (ISO 03) and EOT (ISO 04) are not allowed as separator. Default separator at power on is "LF" (ISO 10).	none	

Table 8-8 Programming, separator(s)

Example:
a) "SPR 13" defines "CR" as input/output separator.
b) "SPR 13, 10" defines the sequence "CR LF" as input/output separator.

2. Escape functions

ESCAPE (n)	Function
1	Goto local
2	Goto remote
3	Goto local and unlock
4	Device clear
5	Local lock out
7	Status request
8	Device trigger

Table 8-9 Escape functions

When using the "ESCAPE 7" function, a status byte will be send to the controller:

Bit	Condition
7	EXT
6	RQS
5	AB
4	BSY
3	EF3
2	EF2
1	EF1
0	EF0

Table 8-10 Status byte

EXT:
not used

RQS:
service request

AB:
Abnormal condition

	AB
0	Normal (no error)
1	Abnormal (error condition as specified by EF0-EF3)

BSY:
Busy

EF0-EF3:
Message flags

AB	EF3-EF0	Dec.	Message
0	0001	1	Message string available
1	1100	12	Number error
1	1101	13	Execute error
1	1110	14	Head/suffix error
1	1111	15	Syntax error

The RS232/V24 interface is not capable of generating a hard-wired service request as no connector pin is dedicated to this purpose. However, a controller programme that regularily checks the status of the RQS bit, may serve as a makeshift for the "real" hardwire request.

8.3.3 Device Programming, RS232/V24

A list of the available programming commands and a description of the programming syntax to be used can be found in paragraph 8.4

8.4. Programming Commands

Comments are printed in *italics.*

8.4.1 Identification and Status

HEADER:	DATA:	SUFFIX:	RETURNS:
QUERY ON ID:			
ID?			PHILIPS, PM5655M..x.z *Identification and S/W version (x.z)*

Status Information

STATUS?			*Returns a string with status information. Examples of a returned answer:* NORMAL LOCKED OUTR INS:1 *i.e. NORMAL MODE, Genlocked, AGC (PM 8555) out of range, insertion of VITS group1*

Abbreviation table for Status Information:

NORMAL	NORMAL mode
FULLF	FULL FIELD mode
BYPA	BYPASS mode
LOCKED	LOCKED to input
UNLCKD	UNLOCKED to input
INS:n, p, x	Inserting the groups n, p, x
SUBST	Substitution of program signal
ASYN	Asynchronous External signal detected (PM 8557)
OUTR	AGC out of range (PM 8555)

VITS Status

VITSSTATUS? **VITSSTAT?**			*Returns a string with status information. Examples of a returned answer:* INSRT GRP1: INT, EXT1,2 *i.e. Group 1 is inserted with signal from Internal generator and EXT1 and EXT2 inputs*

Abbreviation table for VITS Status Information:

DISABLED	PM 5655 is not inserting for erasing
INSERTS NONE	Message in BYPASS
INSRT GRP n	Insert group n

HEADER:	DATA:	SUFFIX:	RETURNS:

8.4.2 Mode and Pattern/Signal Commands

Selection Of Mode

MODE **MO**		NORMAL BYPASS FULLF	
MODE? **MO?**			MODE: NORMAL MODE: BYPASS MODE: FULLF

Bypass Mode

BYPASSMODE **BY**		RELAY ELECTRIC SUBSTITUTE BBSUBSTITUTE	
BYPASSMODE? **BY?**			BYPASSMODE: *string* *string:* RELAY, ELECTRIC, SUBSTITUTE BBSUBSTITUTE

Selection/Query Pattern

PATTERN **PA**	n *n: 1-n_{MAX}* *(refer to appendix A)*		
PATTERN ? **PA ?**			PATTERN n *n is pattern no.,* *(refer to appendix A)*

Select/Query Pattern Group

PGROUP **PG**	p[,n] *p: 1-2* *group [, pattern]* *n: 1-n_{MAX}* *(refer to appendix A)*		
PGGROUP? **PG?**			GROUP p, PATTERN n *p is pattern group* *n is pattern no.*

Note: The command PG p n will always select the first signal in the new group.

Substitution Pattern

SUBSTPAT **SP**	n *n: 1-n_{MAX}* *(refer to appendix A)*		
SUBSTPAT? **SP?**			PATTERN n *n is pattern no.* *(refer to appendix A)*

HEADER:	DATA:	SUFFIX:	RETURNS:

Substitution Group

SUBSTGROUP **SG**	p[,n] *p: 1-2* *p[,n]: group, pattern* *n: 1-n_{MAX}* *(refer to appendix A)*		
SUBSTGROUP? **SG?**			SUBSTGROUP p SUBSTPAT n *p is group no.* *n is pattern no* *(refer to appendix A)*

Select/Query APL

APL		ON OFF	
APL?			APL ON APL OFF
APLLOCK *Sequency locked to field*		ON OFF	
APLLOCK?			APLLOCK ON APLLOCK OFF
APLLEVEL **APLL**		BLACK GREY WHITE BOUNCE	
APLLEVEL? **APLL?**			APLLEVEL *string* *string*: BLACK GREY WHITE BOUNCE
BOUNCERATE	x *x: 0.1-25.5 sec* *0.1 sec step*		
BOUNCERATE?			BOUNCERATE x SEC *x:0.1-25.5 sec*

8.4.3 VITS Commands

Selection of VITS Group

VITSGROUP **VITSGR**	n *n: 1-8*		
VITSGROUP? **VITSGR?**			VITSGROUP n *n:1-8*

Edit of VITS Group

EDITGROUP **EDITGR**	n *n: 1-8*		
EDITGROUP? **EDITGR?**			EDITGROUP n *n: 1-8*

Note: Editing is possible even when the VITS group is not active.

HEADER:	DATA:	SUFFIX:	RETURNS:

Programming/Query of VITS Group

VITSTYPE **VITS**	f,n,p[,a] *f: field no., 1 or 2* *n: line number* [1] *p: signal type* [1] *a: frame no., 1 or 2* *(only relevant for group 5)*		
VITSTYPE? **VITS?**	f,n[,a] *f: field no., 1 or 2* *n: line number* [1] *a: frame no., 1 or 2* *(only relevant for group 5)*		VITSTYPE Ff LINE n: TYPE p or VITSTYPE Ff LINE n FR a: TYPE n *f: field no., 1 or 2* *n: line no.* *p: signal type* *a: 1 or 2 (frame 1 or 2) for group 5.*

1: assignment of signaltypes/lines in each VITS group:

In group 1-7 : lines 10-30 in field 1 and 2, signal types 1-n MAX (*refer to appendix A)*
In group 8 : lines 10-262 in field 1 and 2, signal types 1-n MAX (*refer to appendix A)*

8.4.4 Erasure & Insertion Timing

Black and White Genlock

BWGENLOCK **BWGEN**		ON OFF	
BWGENLOCK? **BWGEN?**			BWGENLOCK ON BWGENLOCK OFF

Sync and Burst Substitution

SYNCSUBST		ON OFF	
SYNCSUBST?			SYNCSUBST *string* *string: ON or OFF*
BURSTSUBST		ON OFF	
BURSTSUBST?			BURSTSUBST *string* *string: ON or OFF*

Selection of Synchronization Source

GENLOCK		PROGR EXT	
GENLOCK?			SYNC SOURCE: EXTERN SYNC SOURCE: PROGRAM

HEADER:	DATA:	SUFFIX:	RETURNS:

8.4.5 Programming of Delays Between Modes

Programming of Delays (Substitute <---> Normal <--> BYPASS)

DELAYN (*delay to NORMAL*)	n *n: 0-20 sec*		
DELAYN?			DELAY TO NORMAL n s
DELAYS (*delay to SUBSTITUTE*)	n *n: 0-20 sec*		
DELAYS?			DELAY TO SUBSTITUTE n s
DELAYB (*delay to BLACK BURST SUBSTITUTE*)	n *n: 0-20 sec*		
DELAYB?			DELAY TO BLACK BURST n s *n: 0-20 sec.*

Note: Delay of 0 is minimum delay, less than 1 sec.

Programming of Locks

VITSLOCK		ON OFF	
VITSLOCK?			VITSLOCK ON VITSLOCK OFF
GROUPLOCK		ON OFF	
GROUPLOCK?			GROUP LOCK ON GROUP LOCK OFF

Note: VITSLOCK prohibits programming of all VITS groups
GROUPLOCK prohibits programming of VITS Group 8: all TV-lines

8.4.6 Sync Control

Genlock Phase Control

GENLPHASE **GENL**	n *n: -1100 < n < 1100 ns (increment)*	UP DOWN	
GENLPHASE? **GENL?**			GENLOCK PHASE n ns *-550 < n < 550 ns*

HEADER:	DATA:	SUFFIX:	RETURNS:

8.4.7 Text Commands

Remote control of text pages: Editing commands are only valid, if text editor is not active from the front panel.

Page Control

PS **PR** **RP** *recall page*	n *n:1-16*		
PS? **PR?** **RP?**			ACTIVE PAGE n *n: 1-16*
PE *edit page*	n *n:1-16*		
PE?			PAGE TO EDIT n *n: 1-16*
CP **PC** *clears page n*	n *n:1-16*		
CO *copy page from n to p*	n,p *n: 1-15* *p: 1-15*		
HH *horizontal adjustment*	n *n: 35-63*		

NOTE: The RP command also presets for editing the same page.

Cursor Control

CC *cursor on/off commands*		ON OFF	
CL *cursor left (1 character)*			
CR *cursor right (1 character)*			
CU *cursor up (1 line)*			
CD *cursor down (1 line)*			

Insertion - the cursor has to be ON before insertion is possible.

LI *inserts line, last line drops out*			
II *inserts n empty spaces, default 1*	n *n: 1-24*		
TT *inserts textstring*	"textstring" Note the quotation marks!		

HEADER:	DATA:	SUFFIX:	RETURNS:
AA *inserts ASCII character at cursor position. Cursor must not be on last position on line.*	nn *nn is the ASCII character number (see table A2)*		

Delete Text - the cursor has to be ON before insertion is possible.

LD *deletes line, next line moves up*			
LC *clear line (erase characters)*			
DD *deletes n characters at cursor position, default is 1*	n *n: 1-24*		

8.4.8 Miscellaneous

TTL *Programming of TTL*	n,p *n: pin no.: 5-12,18-23* *p: function: 0-48 and 64-79* *(refer to paragraph 6.3)*		
TTL ?	n *n: 5-12, 18-23*		PIN n FUNCTION p *refer to paragraph 6.3*
OPTIONS?			NONE VIPRC = *Video proc.* *ASYNC* = *Asynchr. detectors* KEY = *Video keyer*
TEMP?			TEMP=x *x is the measured temperature in* °C.
GLOBAL **GLO**		ON OFF	
GLOBAL? **GLO?**			GLOBAL *string* *string: ON or OFF*
SPR *Change of separator for commands*	n[,p] *n: 0-31* *p: 0-31*		

8.4.9 Options

Video Keyer, (Only When PM8554 is Mounted)

VIDEOKEY		ON OFF	
VIDEOKEY?			VIDEOKEY *string* *string: ON or OFF*

HEADER:	DATA:	SUFFIX:	RETURNS:

Video Processor Commands (Only When PM 8555 is Mounted)

VIDEOGAIN **GAIN**	n *n: 0.76-1.42, range of gain*	MAN AUTO	
VIDEOGAIN? **GAIN?**			VIDEOGAIN *n string* *n: 0.76-1.42* *string: MAN or AUTO*
REFLINE	n *n: 10-21, line no. for reference*		
REFLINE?			REFLINE n *n: 10-21*
REFPOS	x: *x: 0-51* *Position of reference in µs from start of line.*		
REFPOS?			REFPOS x us *x: 0-51µs*
REFGAIN		HOLD MAN	
REFGAIN?			REFGAIN *string* *string: HOLD or MAN*

Programming of Detectors For Non-Synchronous External Inputs (Only When PM 8557 is Mounted)

ASYNCDET **ASYNC**	n *n: detector no.*	ON OFF	
ASYNCDET? **ASYNC?**	n		ASYNCDET n: *string* *n: detector no.* *string: ON or OFF*

SERVICE INSTRUCTIONS

9. General Information

9.1 Use of the Service Instructions

Troubleshooting is best carried out on a functional level using block diagrams. Reference is made to Chapter - "Block diagram description" for an overall description of the instrument. The block diagrams of each individual unit are described in the chapters to follow. These diagrams contain sufficient information for a skilled technician to carry out performance checks, adjustments, maintenance, and fault finding down to stage level. Fault finding to component level will however, require the use of appropriate circuit diagrams.

9.2 Safety

The opening of covers or removal of parts, except those to which access can be gained by hand, is liable to expose live parts. Accessible terminals may also be live.

The instrument must be disconnected from all voltage sources before performing any adjustment, replacement, maintenance, or repair which requires the instrument to be opened. If adjustment, maintenance, or repair of the opened instrument is unavoidable, it must only be carried out by a skilled person who is aware of the hazards involved.

9.2.1 Electrostatics Sensitive Devices

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).

Careless handling during repair can reduce life drastically.

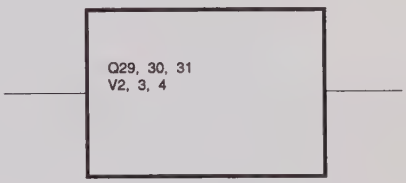
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

9.3 Block Diagram Symbols Description

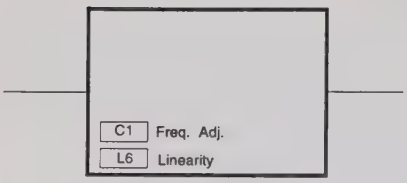
Various symbols and conventions are used in the block diagram and a short description of these is given below.

Functional Block Information

The underlined text within the block gives the function provided by the block.



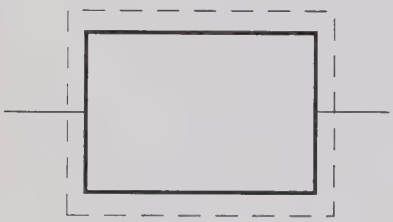
Text shows the major components in the block or stage.



Inside some of the functional blocks, there are other smaller blocks. These show the adjustable components within the stage and what they adjust. An explanation of their use is given in the appropriate adjustment procedure.

The number in the lower right hand corner of the block shows on which sheet of the appropriate circuit diagram the block may be found.

The Dotted Line



A dotted line around a functional block (or stage) means that the block is either an option or not used in all versions of the instrument.

The Numbered Diamond

A number in a small diamond refers to a measuring point in the test and adjustment procedures. These symbols are cross-referenced both on the block diagram and its corresponding checkpoint sheet.

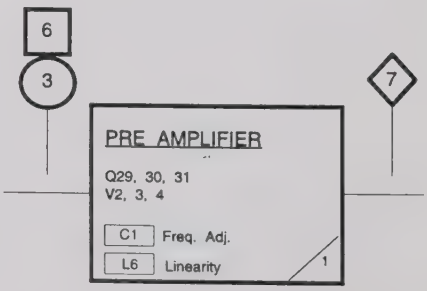
The Numbered Square

A number in a small square refers to an oscillogram number. These symbols are cross-referenced both on the block diagram and its corresponding checkpoint sheet.

The Numbered Circle

A number in a small circle refers to a test point physically provided on the PCB. These symbols are cross-referenced on the checkpoint sheet, its corresponding block diagram, and the circuit diagram.

Example:



NOTE: All circuit diagrams shows values for the G-version. Where values differ in other version an * indicates this. Make sure when replacing a component that one of same value is re-installed as is removed. Values for other versions are found in "List of Electrical Parts".

10. Wiring Diagram

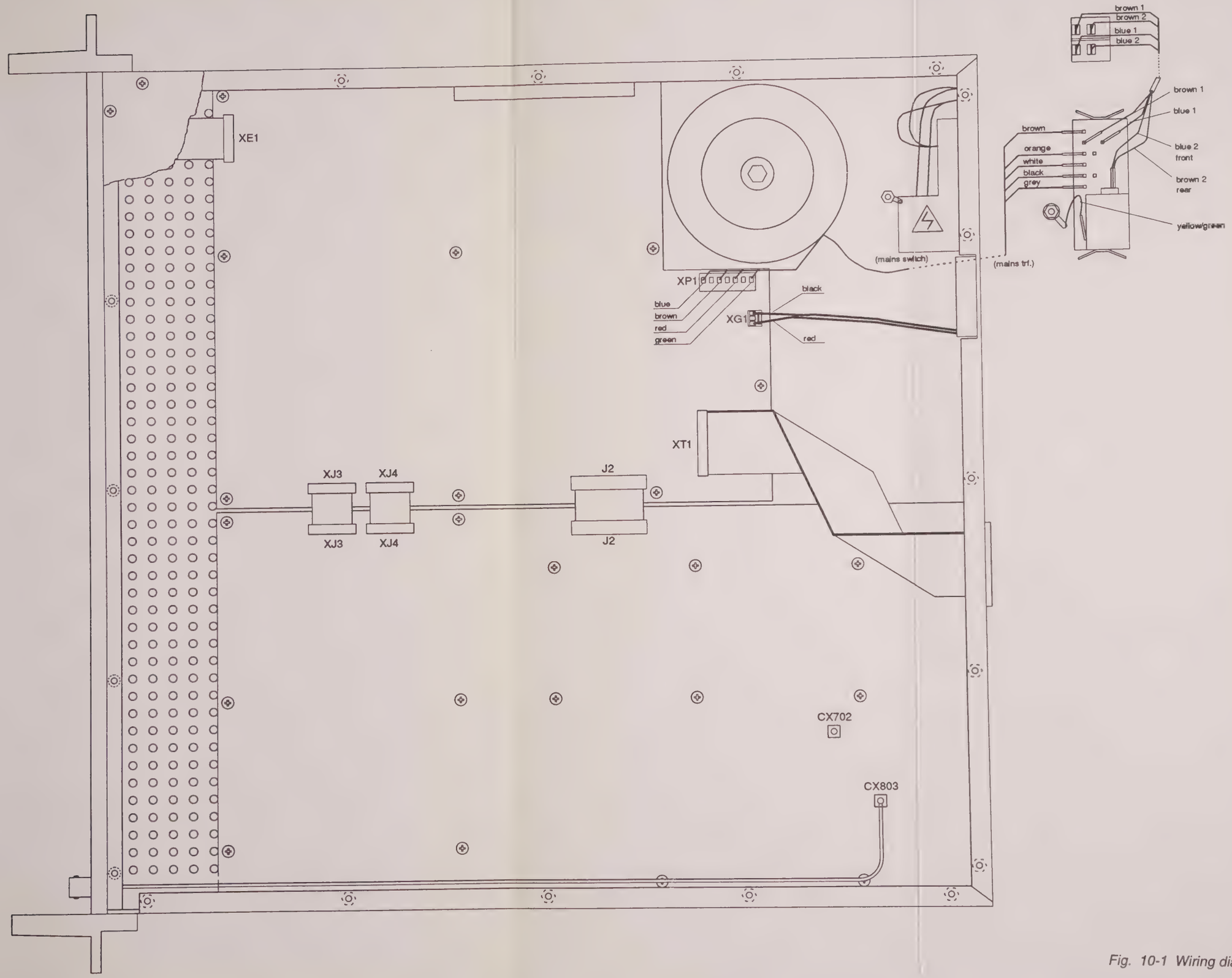


Fig. 10-1 Wiring diagram

11. Instrument Block Diagram

11.1 General Information

The circuitry of the PM 5655 can be divided into a number of functional blocks:

The program signal route, which consists of the signal path from program input to program output of the apparatus.

The master control block, which controls the function of the sync pulse generator and the full-field generator and inserter control. The master control also handles communications between these units, the front panel, the TTL interface, and the options.

The sync pulse generator, which generates video sync reference signals and internally required clock signals. The sync pulse generator also for checks the presence of valid sync and burst on the program input signal and signals this presence to the inserter control.

The full-field generator and inserter control, which can be divided into two main blocks. **The full-field generator** is responsible for the actual generation of VITS signals and full-field test patterns. **The inserter control** generates the signals necessary to operate the various switches in the program signal route in order to control insertion of VITS signals, text, and source code.

The front panel, which is interface between the instrument and the user via pushbuttons and the display.

The TTL interface, which is the interface between the instrument and the user via an external control box.

11.2 Program Signal Route

The video program signal (PROG IN) is buffered before it enters the input selector. The input selector selects between two external signals and the PROG IN signal. The signal is clamped to ground (GND) before further signal handling. The clamped input signal is applied by the following options:
– the Video Keyer
– the Video Gain Regulator

The clamped input signal is applied directly to the program insertion switch where VITS or full-field signals may be inserted in place of the original PROG IN signal.

The program signal (PROG) from the insertion switch is applied to the program output connector (PROG OUT) via the program output amplifier and bypass relay.

If there is a power down or input signal failure, the relay bypass mode is selected. The PROG IN signal is then applied directly to the bypass relay and the PROG OUT connector via a delay equalizer. Bypass relay can also be selected from the front panel.

11.2.1 Inserter Switches

In addition to the program insertion switch described above, the generator contains an external signal insertion switch (EXT INS SWITCH) which inserts the following signals into the internally generated test signal:
– the internally generated Text signal
– one of the four EXT1-4 external signals

11.2.2 Monitoring the Output Signals

All monitoring signals are delivered to the outputs by the same type of output amplifier, which offers a high-quality 1V video output into 75Ω.

The PROG signal taken before the bypass relay is fed to the TEST OUT connector.

The PROG signal taken before the bypass relay and the program output amplifier is fed to the MONITOR OUT connectors located on the rear and front plates.

The signal to be inserted into the program signal (FF-VIDEO signal) is monitored on the TEST SIGNAL OUT connector. This connector may, however, be modified to function as an extra PROG OUT connector.

11.2.3 EXT1/Video Key Signal Switch

In the standard instrument, the external input EXT1 is a high ohmic looped-through input. This input may be modified into two independent video inputs with impedances of 75Ω which carry the two video signals: the Video Fill signal and the Video Key signal. These two signals are applied to the Video Key option.

11.2.4 EXT Input Selector

The EXT input selector has two functions. First, it must select one of the 4 external inputs or the internally generated text signal. Second, it must clamp the chosen signal to the same level as the program signal. One of the five signals (E1 - E5) selects an input (active low).

During burst, the selected signal is clamped in two steps. First the "FORWARD CLAMP" circuit charges the storage capacitor (C263). This charge is fed through switch transistor (Q241). The remaining error is then removed by the feedback clamp-circuit (V242) and associated components built around V241.

Though the input buffers are common collector circuits, their gains are identical (depend only on the terminating resistor). One common gain adjustment is then sufficient. The text generator requires separate adjustment.

11.2.5 EXT INS Switch

The switch is built around Q603 and Q604, the output signal being amplified by V603. This switch inserts the chosen external signal on the program signal. It also makes a black square in the internally generated test signal when text is selected. The timing of this switch enables the PM 5655 to insert a black signal between the program signal and the inserted external signal.

11.3 Master Control Block

The master control block collects commands from:
- the front panel
- the TTL interface
- the remote interface

and distributes these commands to:
- the full-field generator and inserter
- the sync pulse generator
- the text generator
- the various options.

Status signals for presentation on the front panel etc. are distributed in the opposite direction.

The master control also regulates the fan speed according to temperature.

The master control block is composed of:
- a microcontroller (V601)
- an address latch (V607)
- program ROM (V603)
- the battery backed-up RAM (V604).

The watchdog circuit (V602) ensures recovery from deadlock errors. It also generates a reset pulse for the microcontroller at power-on.

Communication with the TTL Interface, the Remote Interface, and the rest of the apparatus is done

by means of three separate IIC-bus connections. The communication with the front panel is done over a fast (375 kbits per second) duplex bus (FRONT-RXD and FRONT-TXD) through pins 10 and 11 of the microcontroller.

Once the microcontroller has completed its own initialization after power-on, it resets the other microcontrollers and some of the hardware in the apparatus via MRES on pin 6. The signals UNIT-ACK to pin 12 and UNIT-INT to pin 13 are acknowledged by the full-field generator, forming a sort of handshake to speed up communications.

The temperature is measured at regular intervals by the NTC resistor (R611) and an AD - converter inside V606. The temperature value is read by the microcontroller and converted to an appropriate fan voltage, which is then sent back via the DA - converter in V606 to transistor Q601 and regulator V608, which supplies power to the fan.

11.3.1 Text Generator

The text generator inserts selected text from 15 programmable text pages into the full-field patterns.

There are 12 text lines possible in the active picture and 1 line in the VITS Interval (occupies lines 10 thru 16).

The character quality is 12 x 18 dots.
The Text Generator V601 receives commands and text from the Master Control via a two-wire IIC bus (UNIT-SDA and UNIT SCL). A power-up reset is performed by /RESET and the unit is synchronized with FIELD and H_TEXT. The L601 coil determines the width of the characters. The text signal is shaped in filters (L602 and L603) and in V602. The TEXTBLANK output provides the background to the text.

11.4 Sync Pulse Generator (SPG)

11.4.1 Synchronization

The PM 5655 may be synchronized either to the PROG IN signal or to an external video signal (EXT1). The synchronization signal is selected in the sync input selector. If neither of the two signals are accepted, the instrument will go into free-running state.

The Sync Out signal originates from the internal test signal generator. It may be chosen from the following three possibilities:
– the test signal itself
– the black burst signalr
– the B/W sync signal

The input to the SPG from unit 2 is called SPGVIDEO. First it goes to a clamp amplifier built around V9. It is then sent on to an anti-aliazing filter built around L1 and then via a buffer to an A/D converter (V3). The digitized video signal is fed to logic circuits V5, V6, and V7, which find Fh and FIELD pulses. The logic circuits also make clamp pulses (e.g. SPGCLAMP) and have a no-sync detector (NS).

The digitized video signal from the A/D converter is also fed to a dual port RAM (V35) so that it can be analyzed by the SPG controller.

The SPG controller consists of a microprocessor system built around V26. The microprocessor analyzes the incoming video data stored in the dual port RAM V35, and outputs control data to the SPG on IO ports V28 and V32. The microprocessor decides whether to genlock to the program signal or to go into free-running state. The synchronization of the microprocessor is done by line-interrupt (SPGINT) from the logic circuit (V62).

The microprocessor also acts as phase comparator for the genlock loop. The phase comparator data is written into the DAC V50 and then fed to a loop filter built around V52.

If genlock is selected, the output from the loop filter controls the *Oven Controlled X-tal Oscillator*

(OCXO) (T50). If free-running mode is selected, the frequency of the OCXO is controlled by R83. The oven temperature is controlled by a regulator circuit built around V57 and the heater (V58).

The output from the oscillator is buffered in V56 and V59.

Logic circuits V60, V61, and V62 contain a horizontal counter and decoder, which are clocked by SPGCLK and controlled by the microprocessor. The logic circuits supply the rest of the instrument with synchronization information.

A lock detector is built around V65 and V66. The output is fed to the microprocessor via V31.

11.5 Full-Field Generator

The generator and inserter is controlled by microprocessor V501, PROM V503, and RAM V505. The microprocessor receives control commands from the MASTER controller using the UNIT IIC bus at V507. The microprocessor is synchronized to the SPG by an Fh interrupt HINT_U and FIELD interrupt FIELD_U. The inserting of ITS is controlled by two SPG signals SYNCAV and LOCK, which should both be true to allow insertion.

The microprocessor controls five PORTs V101, V102, V103, V104, and V105.

The ROM contains the program - code for the microcontroller to:

1. Handle the IIC - interface for communication with the rest of the instrument via the master control
2. Manage the VITS-Generator function & handling of the video memory - bank. The address - decoder is used to generate select signals for RAM, input - port and each of the video control - ports connected to the microcontroller via the eight - bit data - bus. Furthermore, a number of input and output lines, each with a dedicated function, are provided by the various I/O lines of the microcontroller.

V101, V102, and V103 control the insertion via a horizontal counter and decoders V115, V116, and V117. The horizontal counter is synchronized to the SPG via GENCLK, HGEN and NEWLINE.

The horizontal counter also controls the signal generation.

The signal selection is written to V104 and V105. The value of these is loaded into a counter (V108-V112) which controls the address look-up table contained in the PROMs V113 and V114.

The signal data is stored in four 16 bit wide PROMs (V171-V174). They are addressed by the data from the address look-up table through latches V119 and V120. The 64 bit output from the signal data PROMs is multiplexed together to form a 32 bit video data signal by V161-V168.

12 bits of the video data signal are used for luminance. They are fed directly to the luminance DAC (V301).

12 bits of the video data signal are used for chrominance. They are fed directly to the chrominance DAC (V305).

11.6 Video DACs and Filter

The output - currents from D/A converters V301 and V305 are added directly on the outputs. The converted signal is then lowpass filtered by L309, L310, L311, and the surrounding capacitors. The filter is delay equalized by means of L304, L305, L306, L308, and the surrounding capacitors. The filtered signal is then amplified (V303) and clamped (V304, Q302, Q303, and Q304). The amplifier also performs the necessary sinx/x correction, which is done by L312 and surrounding capacitors.

There are three outputs from the amplifier:

- SYBU, which is used for the SYNC output.
- REF_VIDEO, which is used by V208 (The async detector option).
- TESTSIGNAL, which is used to insert on the program signal.

11.7 Front Panel Unit

The front panel unit handles the user - interface of the PM 5655 via the master controller. It controls and displays the various status and settings of the PM 5655. The front panel unit consist of three parts:

1. A Controller Unit built around a 80C52 microcontroller (V1) supported by an address - latch (V2), a ROM (V3) and an EE-PROM (V7). Furthermore, the unit contains a read/write - control (V4) for the LCD-module, a contrast - control (V5 & V6) and a backlight setup (R5-7).
2. An LCD - module (2-lines by 40-characters), complete with drivers and an LED backlight.
3. A Keyboard Unit containing a keyboard - port (V21), all switches, an LED - port (V22) and the LED - indicators.

The function of the front panel unit is controlled by the controller, whose ROM contains the program code for the microcontroller. The EE-PROM is used for storage of vital information such as contrast level, etc.

After reset at power-up (MRES) and reception of requested instrument - status and data, the controller enters a diagnostic - mode in which any detected errors will be displayed in the LCD - module. If no errors are detected, the controller will enter normal - mode.

11.7.1 Unit Interface

Communication with the rest of the instrument is performed by a serial - interface (FRONT-BUS) using the built-in serial - interface of the microcontrller (TxD/RxD). All operational control and some configuration is carried out via menus by means of four cursor- and an execute - key in conjunction with the LCD - module.

11.7.2 LCD - Module

Update of the LCD - module connected to the microcontroller is performed via the eight - bit data bus and the read/write - control (DISP-EN). For temperature - compensation of the contrast - level, the microcontroller reads the temperature at ADC-1 of V5 using a two-line IIC - interface (DISP-SCL/DISP-SDA).

The backlight level (VBL) is set by the resistors (R5-7).

11.7.3 Keyboard Unit

Scan and update of the keyboard unit is performed via an IIC - interface (KEYB-SCL/KEYB-SDA), using V21 to read actual switch - status (S1-10) and V22 for updating the BYPASS, NORMAL, FULLFIELD, UNLOCKED, and REMOTE LEDs.

11.8 TTL Interface

The TTL Interface offers the user an easy way to remote-control selected functions of the apparatus; it also provides outputs to display-selected statuses of the apparatus. The connection to the Interface is done via a 25-pin Sub-D connector at the rear of the apparatus. Four inputs and four outputs are preassigned; 14 pins can be programmed to various input and output functions. The connector also includes a 5V power source which can deliver 50mA to drive external indicators.

All three ports (V550, V560, and V570) are connected to a 2-wire IIC bus for communication with the master control.

11.9 Power Supply

The power supply consists of:
– a mains transformer
– a rectifier
– five voltage regulators.

V301 is a switch-mode regulator which generates the +5V voltage that is used throughout the generator. An unregulated voltage, VSTANDBY, drives the fan circuit.

The +10V and -10V voltages are generated by linear regulators V304 and V305.

The -5V (-5V-A) voltage is generated in two steps. First a switch-mode circuit, V302, generates -8V. This voltage is then, in linear circuit V306, regulated to -5V.

On the power board (unit 1), four local regulators (V51, V53, V54, and V63) supply power to noise-sensitive circuits.

Most of the power is supplied through a relay controlled by the master controller (V601) using the $\overline{\text{POWERDOWN}}$ signal. If an error occurs (e.g. low voltage, too high a temperature), the relay switches off most of the power.
The 5V power for the front panel, master controller, remote interface, and TTL interface is, however, maintained. Power for the fan circuit (VSTANDBY) is also present.

When the error disappears (e.g. the temperature drops), the instrument automatically restarts.

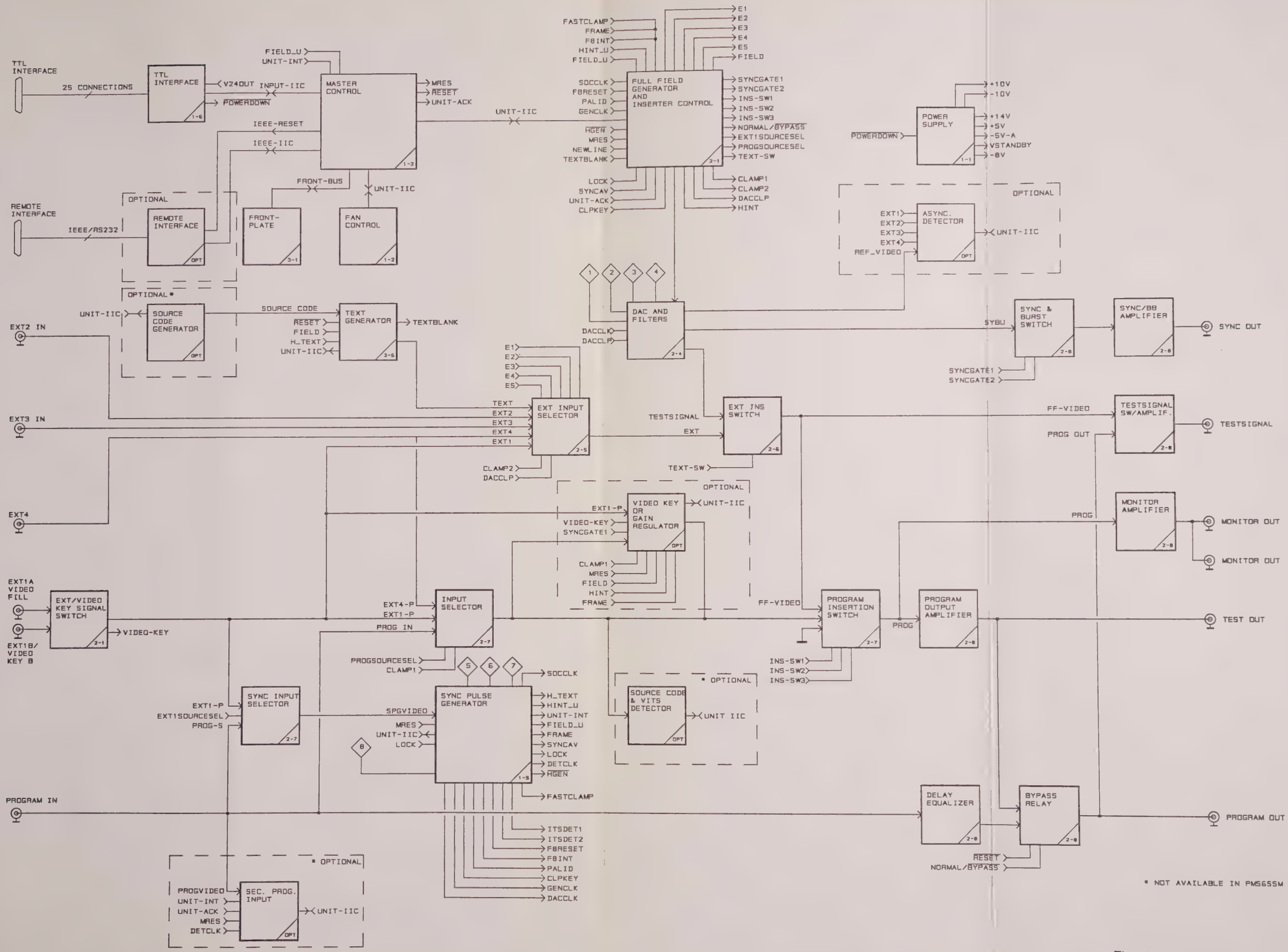


Fig. 11-1 Instrument Block Diagram

12. Performance Check

Test Equipment:

Frequency counter (*accurate to 0.1 ppm*)	: e.g. PM 6669
Video level meter	: e.g. VM700
Oscilloscope	: e.g. PM 3094
Video test signal generator	: e.g. PM 5640AM
Vectorscope, Sc-H	: e.g. PM 5668

1. Oscillator frequency:

– With no signal into the PM 5655 measure the frequency on R66 on unit 1.

Result:

14318180 Hz ± 14 Hz

2. Outputs:

– Select FULL-FIELD with an FCC color bar.

– Measure the white amplitude.

Results:

PROG OUT	: 714 mV ± 7 mV
TEST OUT	: 714 mV ± 7 mV
MONITOR OUT rear	: 714 mV ± 7 mV
MONITOR OUT front	: 714 mV ± 7 mV
Test signal	: 714 mV ± 7 mV
SYNC OUT	: 286 mV ± 10 % or 2 V ± 10 %

Measured with an oscilloscope. Sync level depends upon selection.

3. Program gain:

– Select NORMAL.

– Select an FCC color bar on the test signal generator.

– Measure the amplitude of the white bar.

– Apply the test signal to the program input on the PM 5655.

– Measure the white bar amplitude on program out.

Result:

Amplitude : ± 1 % of reference.

4. External gain:

– Enable TEST-MODE on the PM 5655, apply a black-burst to the program input.

– Select FULL-FIELD.

– Select an FCC color bar on the test signal generator.

– Measure the amplitude of the white bar with video level meter.

– Apply the test signal to the external input on the PM 5655 one by one and select the appropriate EXTERNAL FF test signal in the test menu.

– Measure the white bar amplitude on program out.

Result:

Amplitude : ± 1 % of reference.

5. Program frequency response:

– Select NORMAL.

– Select a multiburst on the test signal generator.

– Measure the frequency response.

– Apply the test signal to the program input on the PM 5655.

– Measure the frequency response on program out.

Result:

Frequency response : ± 1 % of reference.

6. External frequency response:

– Enable TEST-MODE on the PM 5655, apply a black-burst to the program input.

– Select FULL-FIELD.

– Select a multiburst on the test signal generator.

– Measure the frequency response.

– Apply the test signal to the external input on the PM 5655 one by one and select the appropriate EXTERNAL FF test signal in the test menu.

– Measure the frequency response on program out.

Result:

Frequency response : ± 1 % of reference.

7. Program diff. gain and diff. phase:

– Select NORMAL.

– Select a FCC Composite signal on the test signal generator.

– Measure diff. gain and diff. phase.

– Apply the test signal to the program input on the PM 5655.

– Measure diff. gain and diff. phase on program out.

Results:

Diff. gain	: < 0.20 % of reference
Diff. phase	: < 0.15 ° of reference.

8. External diff. gain and diff. phase:

- Enable TEST-MODE on the PM 5655, apply a black-burst to the program input.
- Select FULL-FIELD.
- Select a FCC Composite signal on the test signal generator.
- Measure diff. gain and diff. phase.
- Apply the test signal to the external input on the PM 5655 one by one and select the appropriate EXTERNAL FF test signal in the test menu.
- Measure the diff. gain and diff. phase on program out.

Result:

Diff. gain	: ± 0.2 % of reference
Diff. phase	: ± 0.15 ° of reference.

9. DC matching program video to inserted signal:

- Select NORMAL.
- Measure the blanking level on an internal inserted signal on program out.

Result:

Amplitude	: 0 mV ± 3 mV.

10. DC matching program video to external inserted signal:

- Select NORMAL.
- Measure the blanking level on an external inserted signal on program out.

Result:

Amplitude	: 0 mV ± 3 mV.

11. Test signals:

- With PM 5655 in FULL-FIELD measure:

On a FCC Composite signal.

Bar amplitude	: 714 mV ± 7 mV.
12.5T gain	: 0 % ± 0.5 %
12.5T delay	: 0 nsec ± 5.0 nsec
Static-nonlinarity	: < 0.5 %

On a NTC7 Combination signal.

Frequency response	: ± 1.0 %

On a FCC Composite signal.

Diff. gain	: < 0.6 %
Diff. phase	: < 0.3 °

12. Inserter timing:

- When inserting NTC7 Combination the bar should start at 12 µsec ± 80 nsec.
- The subcarrier phase of the inserted signal should be 180 ° ± 1 °.

13. Sc-H phase:

- With PM 5655 in FULL-FIELD measure Sc-H phase on PROGRAM OUT with a vectorscope.

Result:
0 ° ± 5 °.

14. Genlock:

- The PM 5655 should remain genlocked with the following program signal parameters, tested one at a time.

Results:

Signal amplitude	: ± 6 dB
Noise	: -26 dB
Hum	: 1 V_{PP}

13. Test and Adjustments

Measuring Equipment:

Oscilloscope	: e.g. PM 3250
Voltmeter (DVM)	: e.g. PM 2522
Frequency counter (0.1ppm)	: e.g. PM 6669
Video level meter	: e.g. VM700
Vectorscope	: e.g. PM 5662M
Video generator	: e.g. PM 5640M

Return loss (VSWR) bridge
Hot air source, at least 70°C
Thermometer
Monitor

To select TEST MODE:
– Press buttons ◄ ▲ ► at power on.

Reset/power up
– Begin the procedure with a "Master Reset". This is done by press the buttons ◄ , ► and EXECUTE while power is switched on. The display shows the message "MASTER RESET".
– Switch power OFF and then ON again.
– Check that the display shows "INTERNAL TEST PASSED". This message is only shown a few seconds.
– At power on following error, or combination of errors can occur:

Error #	Error Cause
E(01)	Generator memory back-up not valid.
E(02)	Generator µP not responding
E(04)	Sync µP not responding
E(08)	Master memory back-up not valid.
E(10)	Master µP, local IIC communication crashed
E(20)	Front plate memory back-up not valid
E(40)	Front plate, local IIC communication crashed.
E(80)	Seriel communication between front plate and master-µP crashed.

13.1 Voltage Checks

13.1.1 Unit 2

Connect the DVM ground lead to (4).
1. Using the DVM, check for +5.1V ±0.2V at ◇1 (L303).
2. Using the DVM, check for +10V ±0.3V at ◇2 (V303, pin 7).
3. Using the DVM, check for -10V ±0.3V at ◇8 (V303, pin 4).
4. Using the DVM, check for -5V ±0.2V at ◇4 (L302).

13.1.2 Unit 1

Connect the DVM ground lead to (306).
1. Using the DVM, check for +8V ±0.3V at ◇5 (V52, pin 8).
2. Using the DVM, check for -8V ±0.3V at ◇6 (V52, pin 4).

Check Oven oscillator - unit 1
Using the DVM, check for 0V ±0.5V at ◇7 (V57, pin 3).

13.2 Adjustments Power Supply (Unit 1)

1. Master oscillator frequency:
– No program signal is connected to the PM 5655, the front plate LED "UNLOCKED" is lit.

– Connect the frequency counter to ◇8 (R67)
– Check that the frequency is 14318180 Hz ±5Hz.
– If not OK, adjust R83.

2. Temperature sensor:
- Select TEST MODE and then the thermometer menu.
- Check, that the display shows a temperature that is $8^{o} \pm 3^{o}$ over the actual room temperature.

3. Check the fan control circuit
- Mode: NORMAL
- When R611, unit 1 is heated with hot air, the fan must start to work.
- Continue to heat R611. Looking at the display first you see a warning (inverted !) on right side of display line.
- After a while you must hear a click from a relay, PM 5655 switches to BYPASS and the display shows
  "OVERHEAT!
  FATAL ERROR -> PM 5655 in shutdown mode"
- When R611 cools down, PM 5655 must restart, as it does when power is switch on.

13.3 Adjustments Generator Board (Unit 2)

1. Check clamp-pulses from the sync pulse generator:
- Connect a video signal without VITS signals to PROGRAM IN.
- Connect PROGRAM OUT to a waveform monitor/vectorscope.
- The waveform monitor/vectorscope must be locked to external signal.
- Looking at line 17, internal generated VITS signal (both waveform and vector-signal), check that PM 5655 remains locked with the following conditions, one at a time:

Noise	: -26dB
Hum	: 200IRE
Sync & burst	: +6dB
Sync & burst	: -6dB

2. Gain of program signal:
- Select a signal with a white bar and measure the amplitude.
- Connect the signal to PROGRAM IN.
- Make sure PP701 is set to gain = 1.
- Check PROGRAM OUT, level must be the same ±1%, as the reference measurement.
- If not OK, adjust R707.

- Set PP701 to gain="+3dB"
- Check PROGRAM OUT, level must be 1.4125 x input amplitude ±1%, e.g. output is 1009mV, if input is 714mV.
- If not OK, adjust R725.
- Set PP701 to gain=1.

3. Frequency response of program signal:
- Select a signal with a 10MHz multiburst and memorize the frequency response.
- Connect the signal to PROGRAM IN.
- Check PROGRAM OUT, response must be the same ±1%, as the reference measurement.
- If not OK, adjust C722.

4. DC-offset in electric bypass:
- Remove program signal.
- Select electric bypass.
  Menu: MODE,
  Submenu: BYPASS
  Select:Electric bypass.
- Connect an oscilloscope with 75Ω termination to PROGRAM OUT.
- Check that output level is 0mV ±5mV.
- If not OK, adjust R733.

5. Erase levels:
- Connect a video signal to PROGRAM IN.
- Select TEST MODE.
  Select Submenu: SIGNALS
  Select: Erase FF
- Connect PROGRAM OUT to Video level meter or an oscilloscope.
- Check that erased level is 0mV ± 1mV. (Measure on the middle of the line, somewhere between line 21 to 216).
- If not OK, adjust R327.

– Select TEST MODE.
Select Submenu: SIGNALS
Select: Wide Erase FF.
– Check that erased level is 0mV ± 1mV. (Measure at burst position, somewhere between line 21 to 216).
– If not OK, adjust R727.

6. Amplitude of internal generated VIT-signal:
– Select FULL FIELD.
(Press [FULL FIELD] , then [EXECUTE])
– Connect PROGRAM to a video level meter
– Check that the white bar in line 17 is 714mV.
– If not OK, adjust R308

7. Sync amplitude 2V:
– Connect an oscilloscope to SYNC OUT.
– Set PP803, Sync gain in position 2V output.
– Check that the sync output level is 2V ± 0.1V.
– If not OK, adjust R808.

8. Check sync amplitude 286mV:
– Connect a video level meter to SYNC OUT.
– Set PP803, Sync gain in position 286mV output.
– Check that the sync output level is 286mV ± 15mV.

9. Sync output, blanking level:
– Connect a video level meter to SYNC OUT.
– Set PP803, Sync gain in position 286mV.
– Set PP101/102/103 to Black burst.
– Check that blanking level is 0mV ± 1mV.
Measure position: approx. 32µsec. somewhere between line 21 to 216.
– If not OK, adjust R802.

10. Check of external genlock input:
– Remove signal from PROGRAM IN and connect the signal to EXT1 INPUT.
– Note the correct setting of PP201, PP202, and PP203.
– Select FULL FIELD
– Menu: CONFIGURATION
Submenu: GENLOCK INPUT
Select: Extern synchr. ON.
– Connect PROGRAM OUT to waveform monitor. The waveform monitor is extern locked to the signal on EXT1.
– Check that PM 5655 is locked to the signal on EXT1. (Front plate LED is off, display on waveform monitor is locked).

11. Gain and clamp level, external inputs:
– Select NORMAL, in menu TEST-MODE select EXTERN1
– Measure the white amplitude of the reference video signal, and apply the signal to EXTERN1-input.
– Note the correct setting of jumpers PP201, PP202, and PP203.
– Mount jumper PP204 (test jumper).
– Connect PROGRAM OUT to video level meter.
– Check that blanking level is 0mV ±30mV ref. front porch level, and white level is the same as reference measurement.
– If not OK, adjust the combination R267 and R277

– Add 1V hum to signal at EXTERN1.
– Connect PROGRAM OUT to an oscilloscope.
– Check that hum is removed ie. in the burst all lines must be clamp to the same level.
– If not OK, adjust R248.

– Remove jumper PP204 and remove hum from EXTERN1.
– Check that black level is clamped to 0mV ± 1mV.
– If not OK, adjust R268.

– Check that white level is the same as the reference measurement ±1mV.
– If not OK, adjust R267.

12. Oscillator for the text generator:
– Connect PROGRAM OUT to a monitor.
– Select TEST-MODE.
– Select FULL FIELD.
– Select test pattern "WHITE+TEXT".
– Select PHILIPS test pattern. This will result in PHILIPS test patterns with two text areas.

– Check that the upper text area is lying symmetrical with respect to the grid and the lower text area is lying symmetrical with respect to the lower black text-box in PHILIPS test pattern
– If not OK, adjust L601.

13. Text amplitude:
– Select test pattern WHITE+TEXT.
– Connect PROGRAM OUT to the video level meter.
– Check that text level is 704mV ± 1mV.
– If not OK, adjust R606.

14. Filter response, text generator:
– Connect PROGRAM OUT to an oscilloscope:
– Select test pattern WHITE+TEXT:
– Check pulse response of text-waveforms. Over/undershoot must be less than 1%.
– If not OK, adjust L602 and L603.

15. Low-pass filter, anti-aliasing filter:
– Connect PROGRAM OUT to an oscilloscope.
– Check filter response by examine three test-signals.
– LINESWEEP: Check frequency response ±0.5% to 5MHz
– SINX/X 100%: Check symmetry of pulse.
– MULTIPULSE: Check 2T-pulse-response Ripple before and after the pulse must be less than 1%. The modulated pulses should not be visible S-shaped.
– Select test-signal LINE17.
– Check 12.5T gain. There should not be visible curvature error. Chroma/lumunance gain must be 1 ± 0.5%.
– If not OK, adjust R337.

16. Check of outputs:
– Select FULL FIELD.
– Select test signal: LINE17.
– Check the following outputs for white level, must be 714mV ± 1mV.
PROGRAM OUT
TEST OUT
MONITOR OUT
TEST SIGNAL OUT

17. Delay-equalizer NORMAL/BYPASS:
– Connect a nominal video signal to PROGRAM IN.
– Connect PROGRAM OUT to vectorscope.
– The vectorscope must be extern externally synchronized to video source.
– Check that the change in subcarrier phase is less than 1^{o} when PM 5655 is switched between NORMAL and BYPASS.
– Connect sweep signal to VSWR-bridge input.
– Connect VSWR-output to a spectrum analyzer.
– Connect VSWR-output "DEVEICE UNDER TEST" to PROGRAM OUT.
– Terminate PROGRAM IN with 75Ω.
– Select BYPASS.
– Check for a return loss better than 36dB.
– If not both checks are OK adjust L801/C818. It might be necessary to adjust and check a couple of times.

18. Input Sc-H :
– Check video source on vectorscope, the Sc-H phase must be $0^{o} \pm 5^{o}$.
– Connect video source to PROGRAM IN.
– Carry out the instruction Input Sc-H calibrate. This is done this way:
– Select TEST-MODE
Select: Input-ScH
Select: Calibrate.
– When curser "< >" is at CALIBRATE press **EXECUTE** .

19. Genlock phase (Sync timing):
– Connect PROGRAM OUT to waveform monitor "A"-input.
– Check video source on vectorscope, the Sc-H phase must be $0^{o} \pm 5^{o}$.
– Connect video source to waveform monitor "B"-input.
– Connect video source to PROGRAM IN.
– PM 5655 is in FULL FIELD mode.
– Waveform monitor displays "A-B".
– Check that burst amplitude is minimum ie. phase difference is minimum. Check that sync timing difference is minimum ie. peak that occurs at negative going slope of sync is not more than about 50mV.

20. Phase of inserted VIT signal:

- Connect PROGRAM OUT to vectorscope.
- Connect video source to PROGRAM IN.
- PM 5655 is in NORMAL mode.
- Make sure that test signal FCC Composite is inserted in line 17.
- Check that test signal on line 17 is inserted in +180°.
- If not OK, adjust GENLOCK PHASE FINE.
- The vector must be turned the smaller angel to reach +180°.

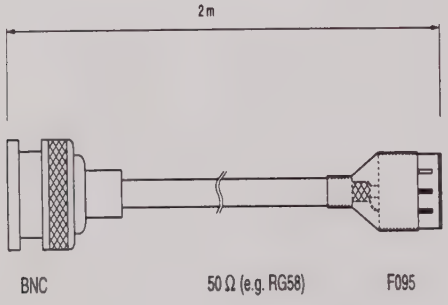
  Select menu: CONFIGURATION
  Select: CALIBRATION
  Select: GENLOCK
  Select: COARSE or FINE as necessary.

13.3.1 Filter Adjustment

If it for some reason is necessary to adjust the filter, you need a network analyzer to align the three zeros and obtain the correct delay-characteristic in the filter. The amplitude-characteristic of the filter is easier to adjust with help of a proper peak-peak detector.

Test Equipment:

Network analyzer	: e.g. HP3577A
Peak-peak detector	: e.g. TEK015-0408-00 with 015-0413-00
Test cable	: *See drawing*



Procedure:

- Connect PROGRAM OUT to a network analyzer input.
- Disconnect jumper PP302.
- Connect network analyzer output to PP30 with test cable.

- Adjust the three zeros:
  L310: 9.75MHz
  L311: 12.0MHz
  L309: 22MHz (or: turn the core to bottom of coil-former, then turn the core anti-clockwise 2 turns).
- Adjust delay-equalizer L304/L306 and L305/L308 so the delay- variations is less than 5ns to 5MHz.
- Adjust sinx/x correction L312/C335 for best high frequency performance (4 - 6MHz).
- Check frequency response using peak-peak detector and the build in field-sweep (allow 1% peakning due to alias components).
- Selecting field-sweep (test mode must enabled):
  Select: TEST-MODE
  Select: SIGNALS
  Select: V-SWEEP.
- Connect jumpers PP302 and PP30.
- Connect test jumper PP301.
- Repeat sinx/x adjustment and frequency check, if necessary.
- Remove test jumper PP301.
- Continue with the task **Low-pass filter, anti-aliasing filter** (Item 15).

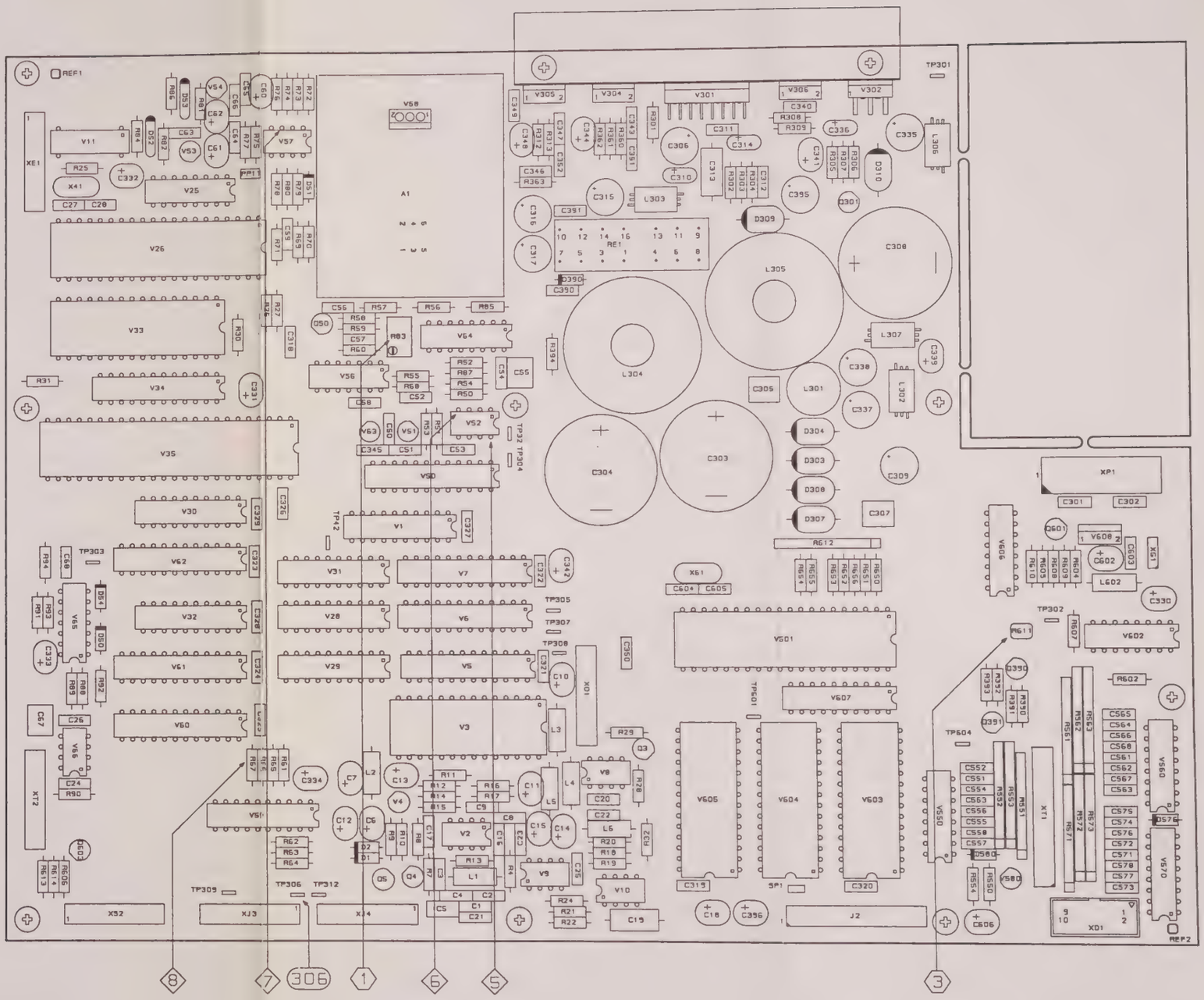
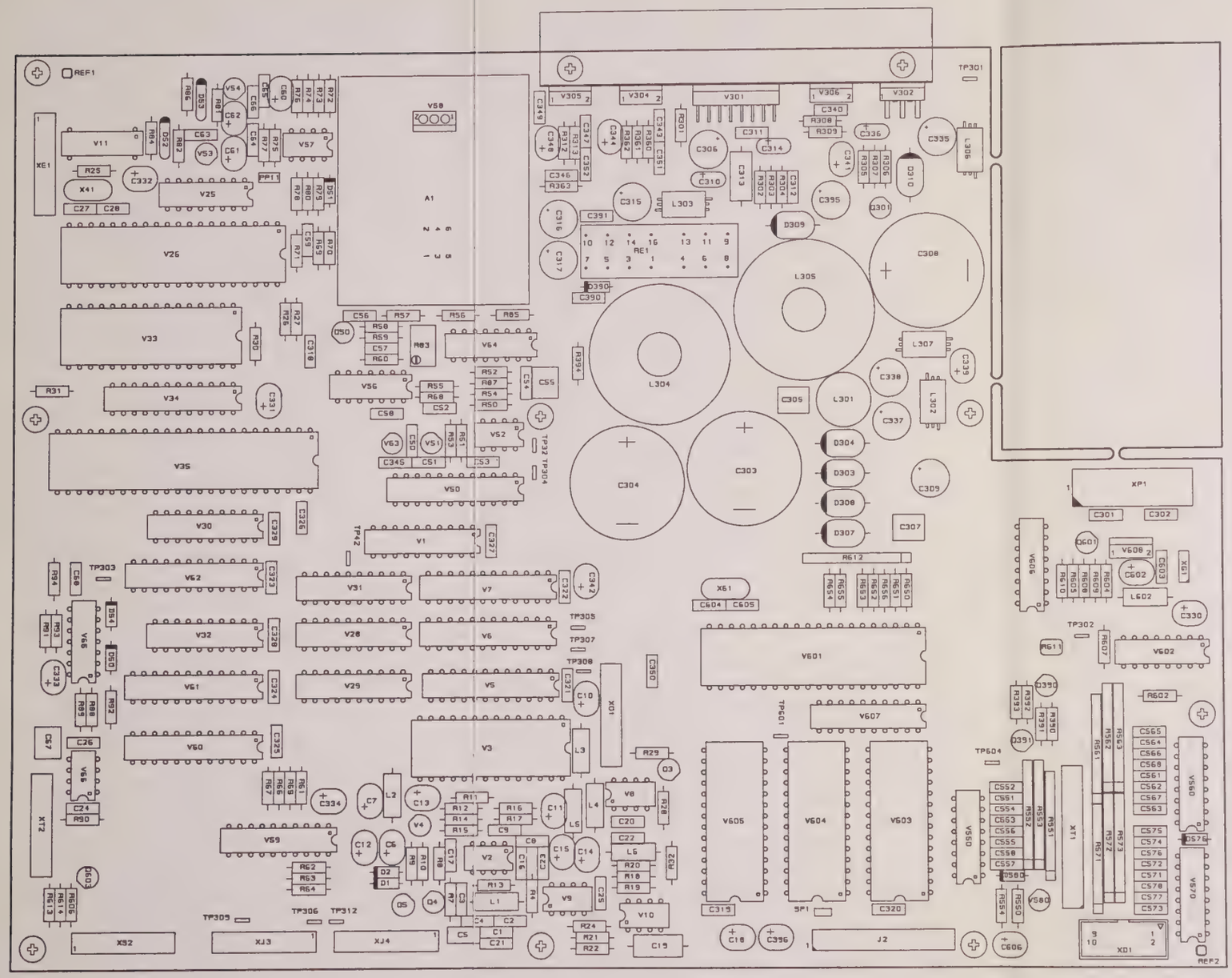
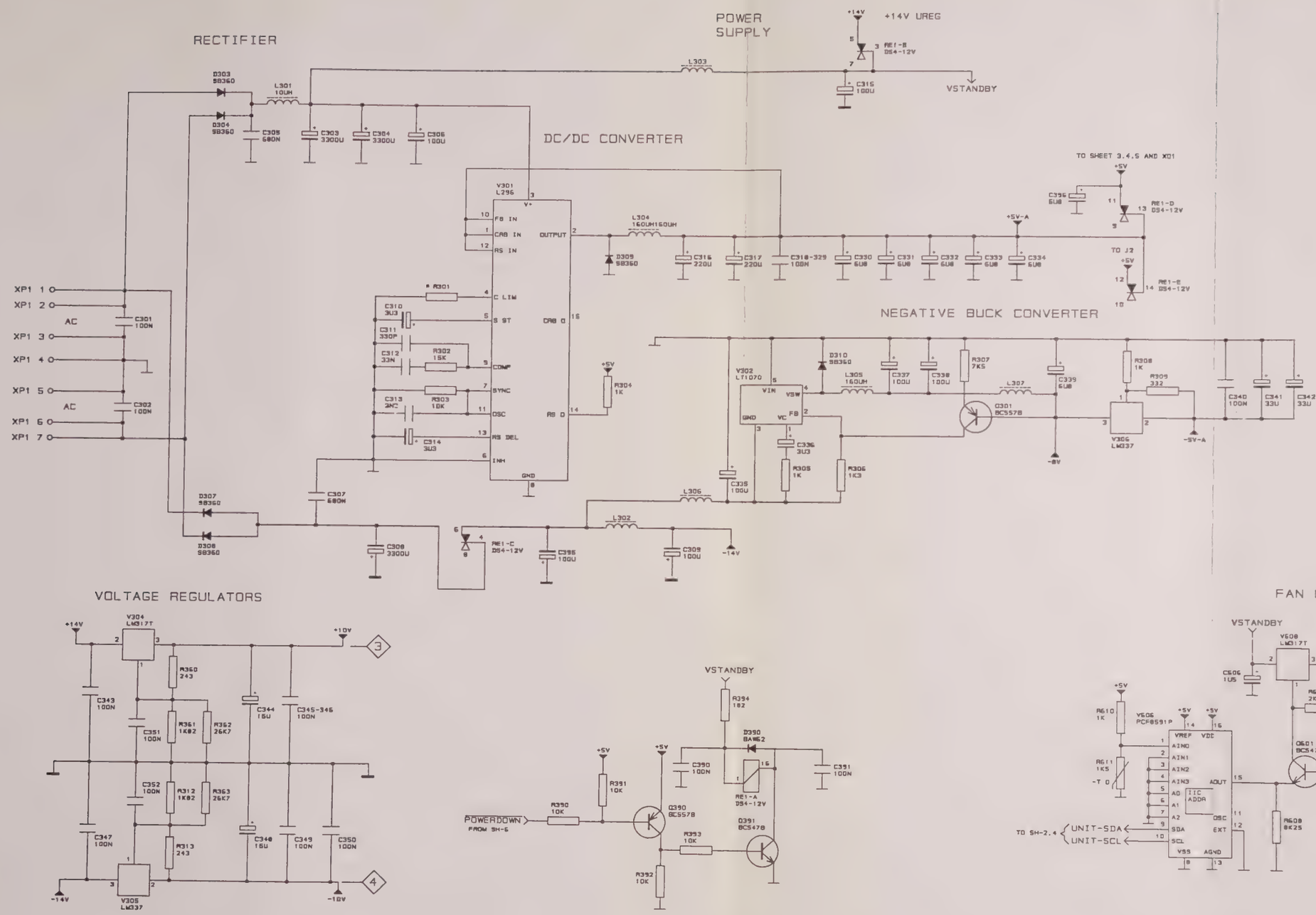


Fig. 13-1 Check points, Power Supply - Unit 1



ATTENTION

Fig. 13-2 Component location, Power Supply - Unit 1



* NOT MOUNTED

109 80920

Fig. 13-3 Circuit diagram, Power Supply - Unit 1, sh.1

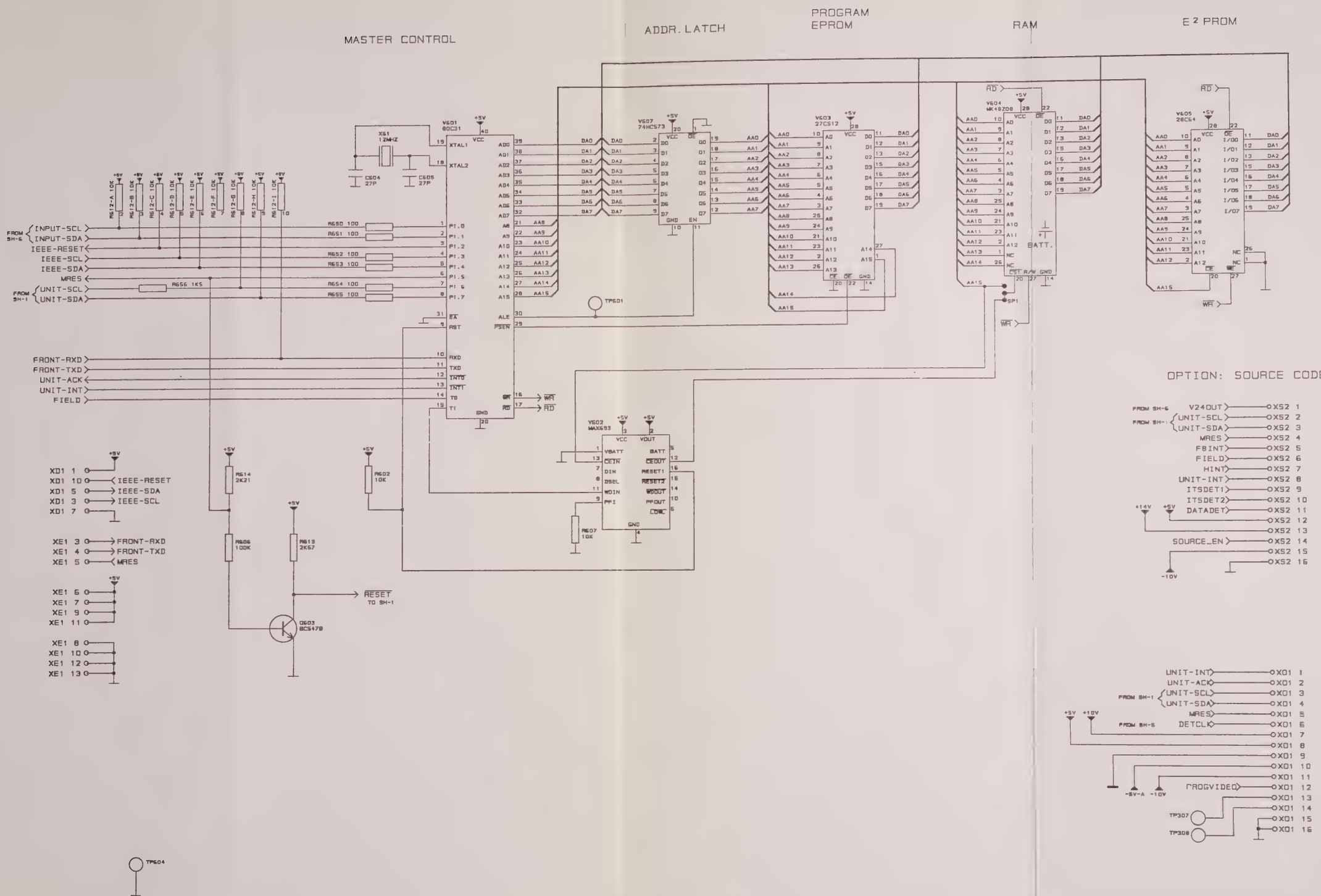


Fig. 13-4 Circuit diagram, Power Supply - Unit 1, sh.2

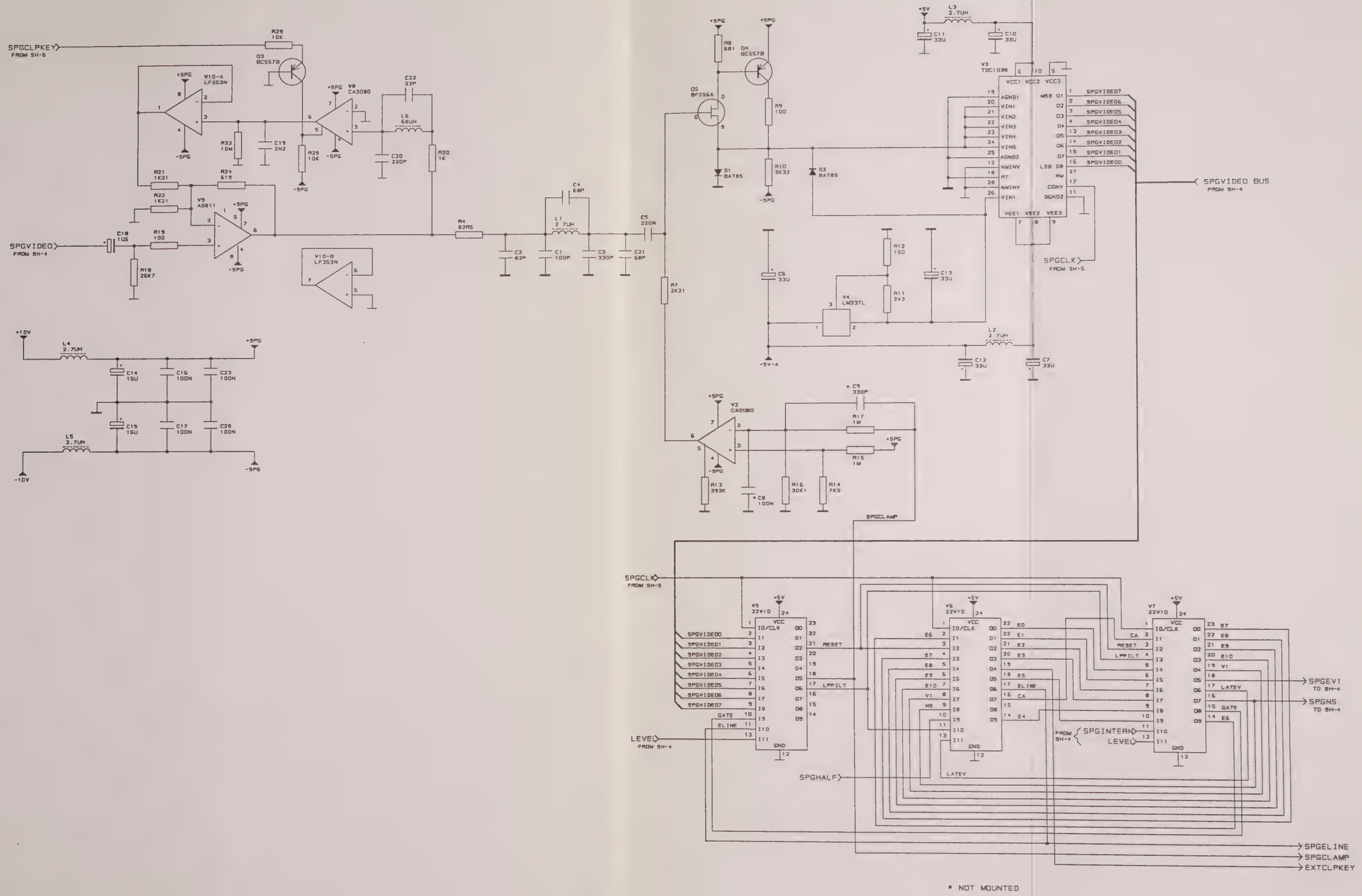


Fig. 13-5 Circuit diagram, Power Supply - Unit 1, sh.3

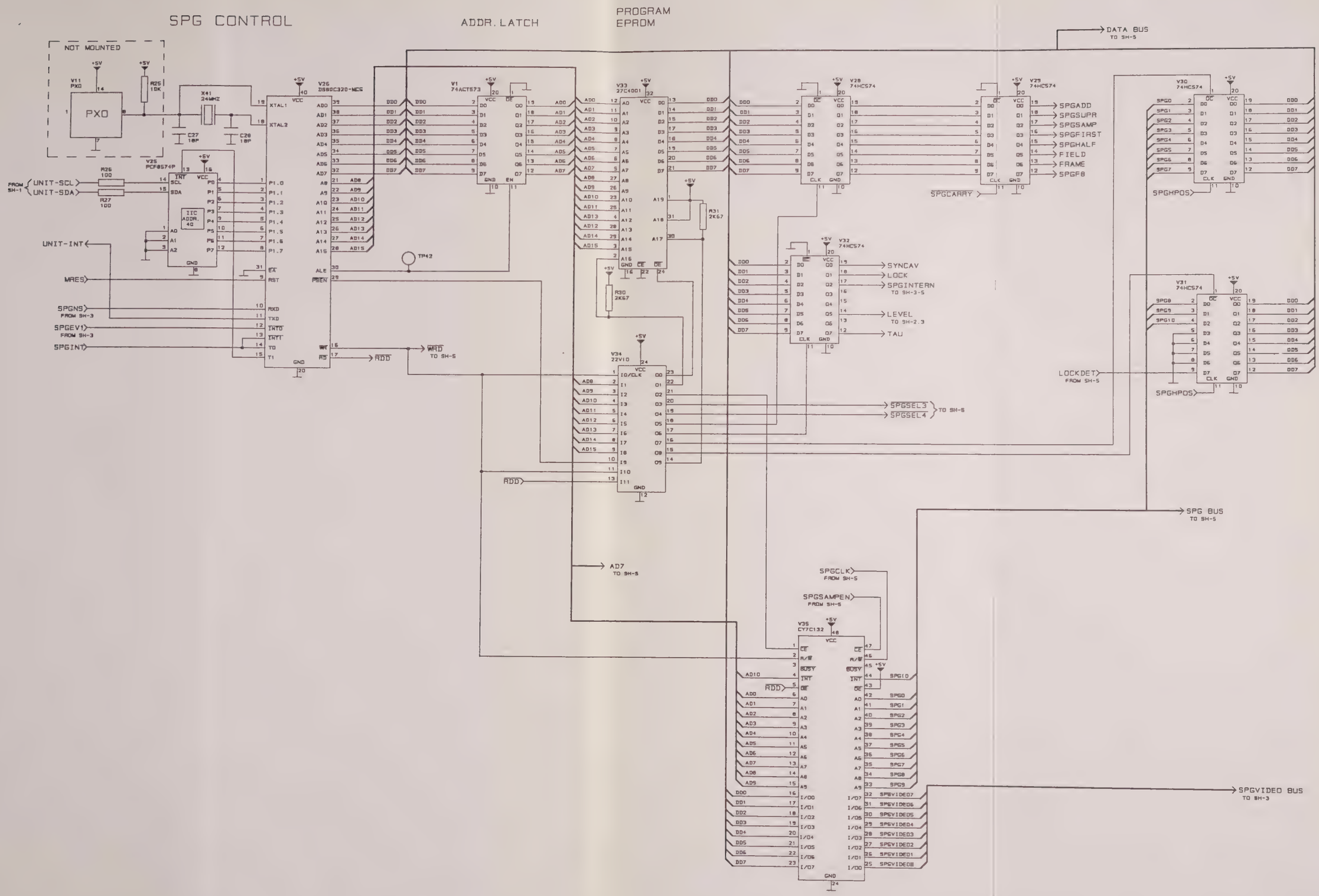


Fig. 13-6 Circuit diagram, Power Supply - Unit 1, sh.4

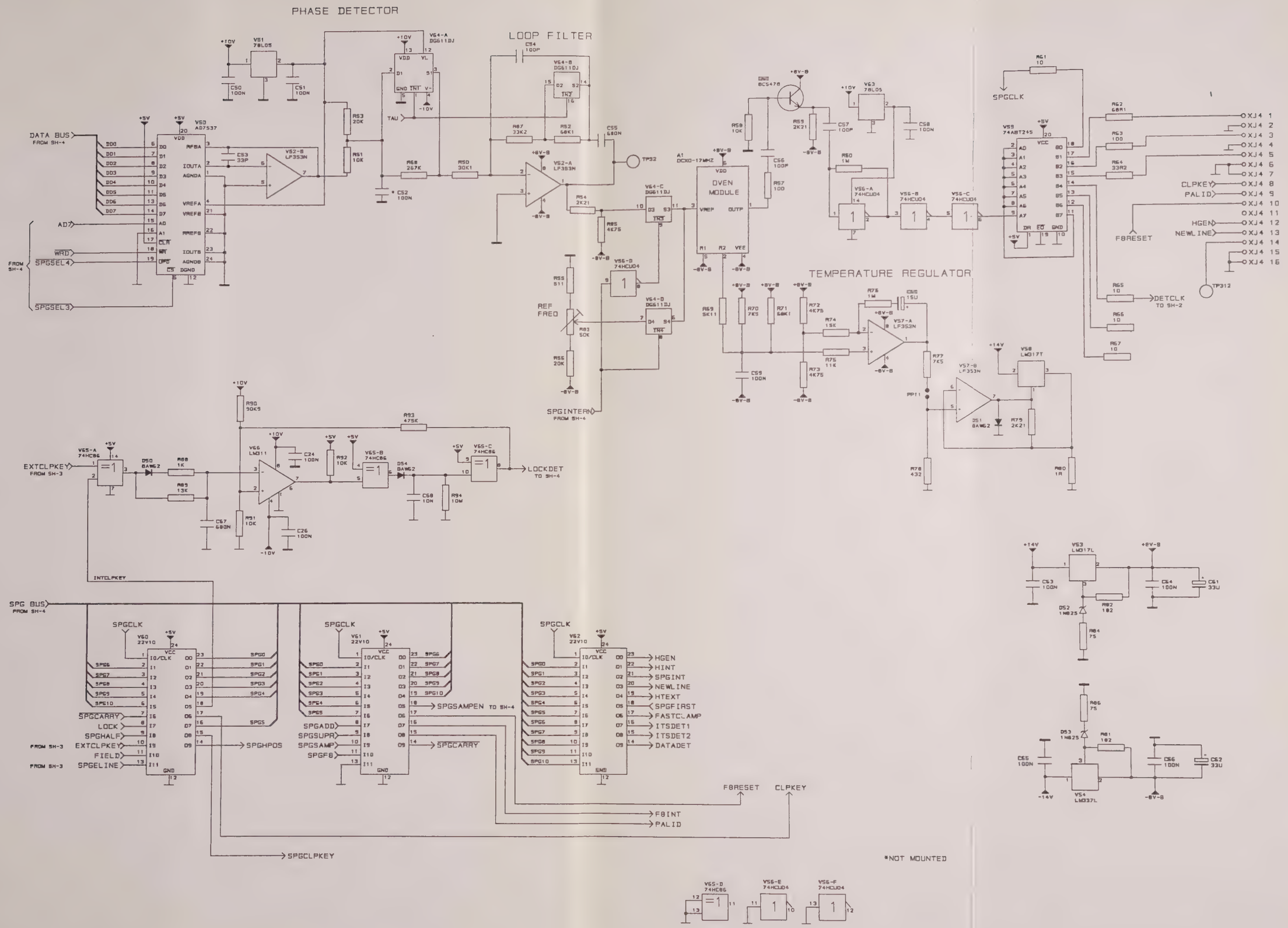
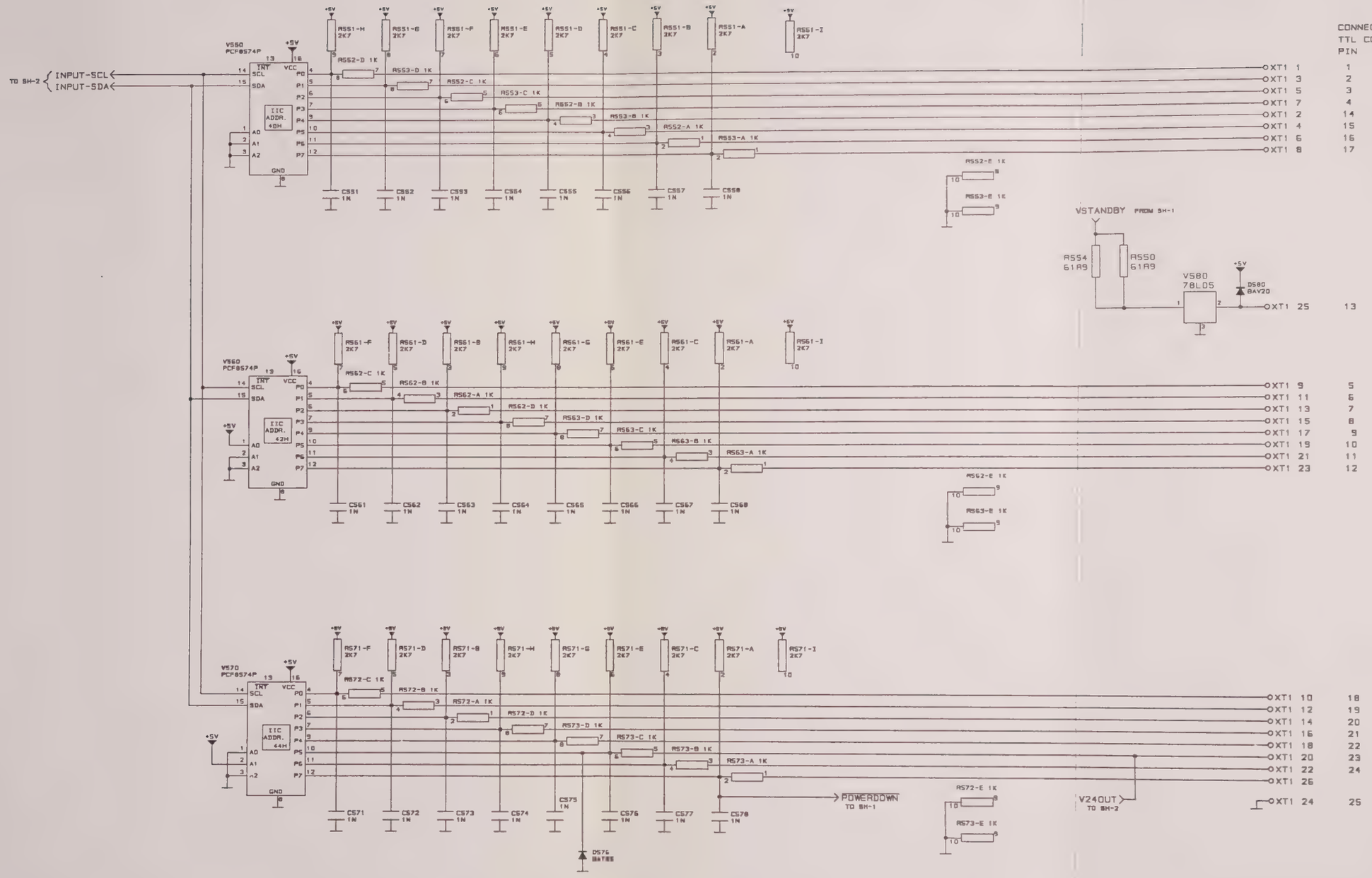


Fig. 13-7 Circuit diagram, Power Supply - Unit 1, sh.5

TTL-INTERFACE



CONNECTS TO TTL CONNECTOR PIN

Fig. 13-8 Circuit diagram, Power Supply - Unit 1, sh.6

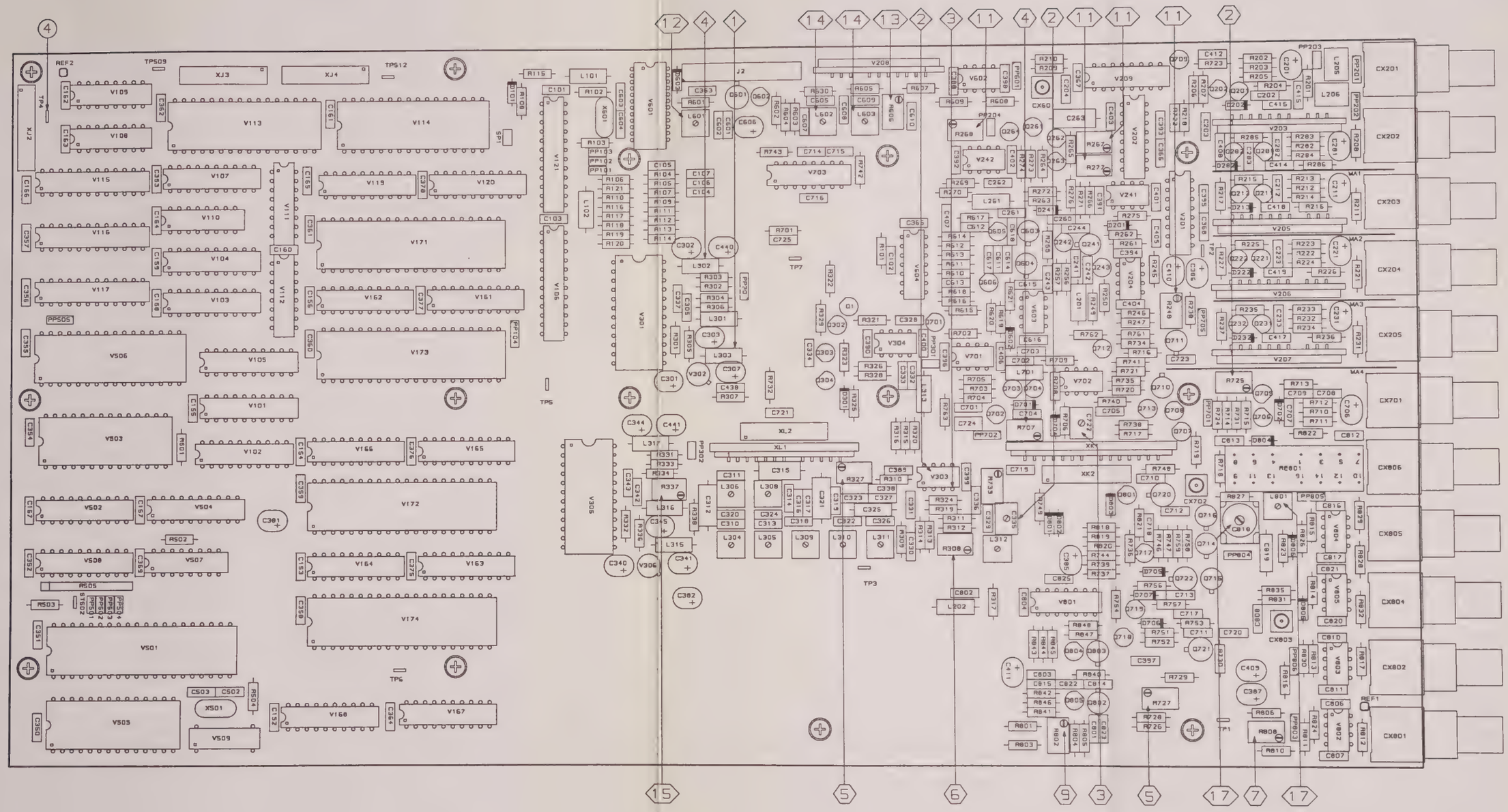
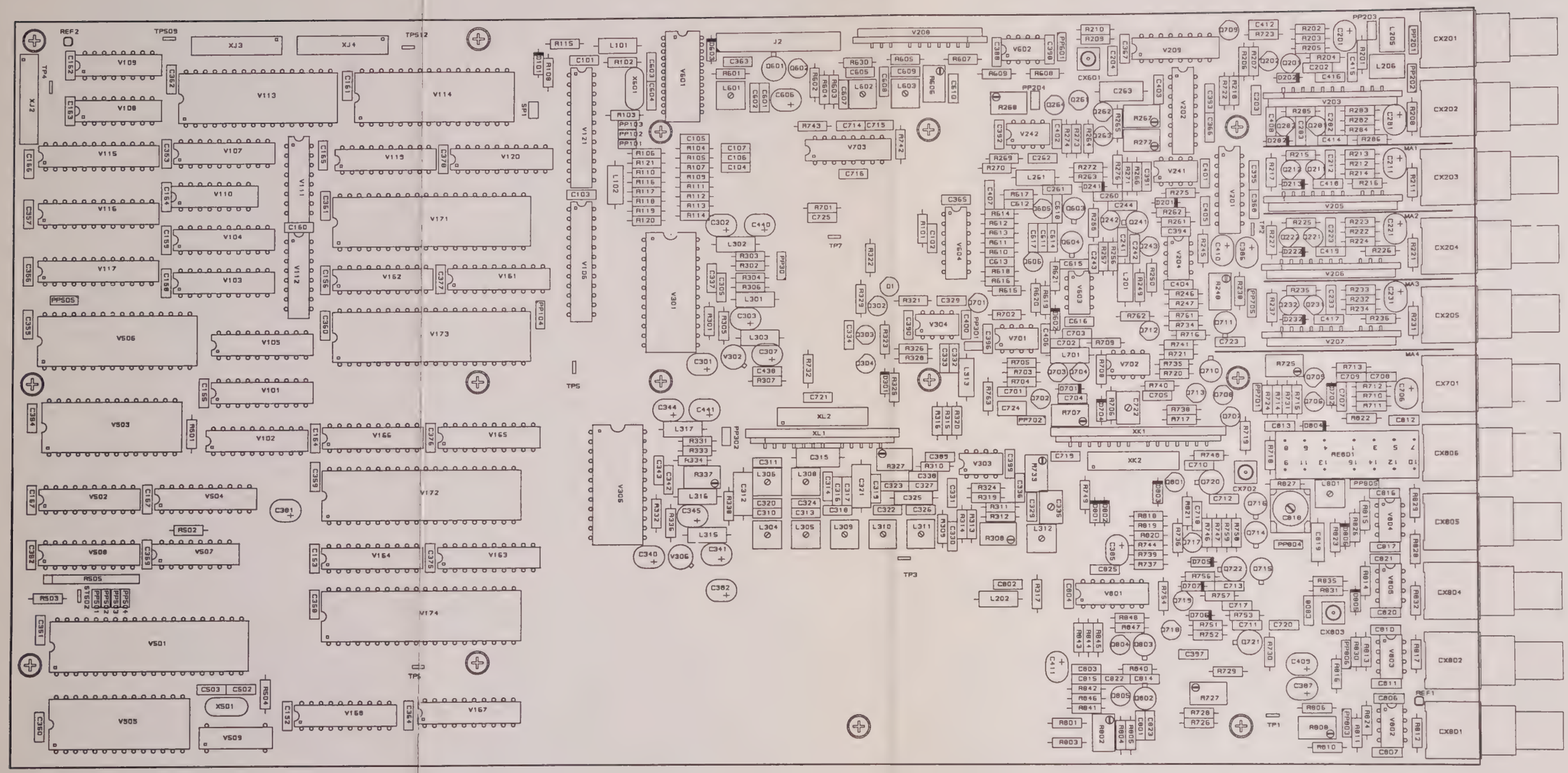
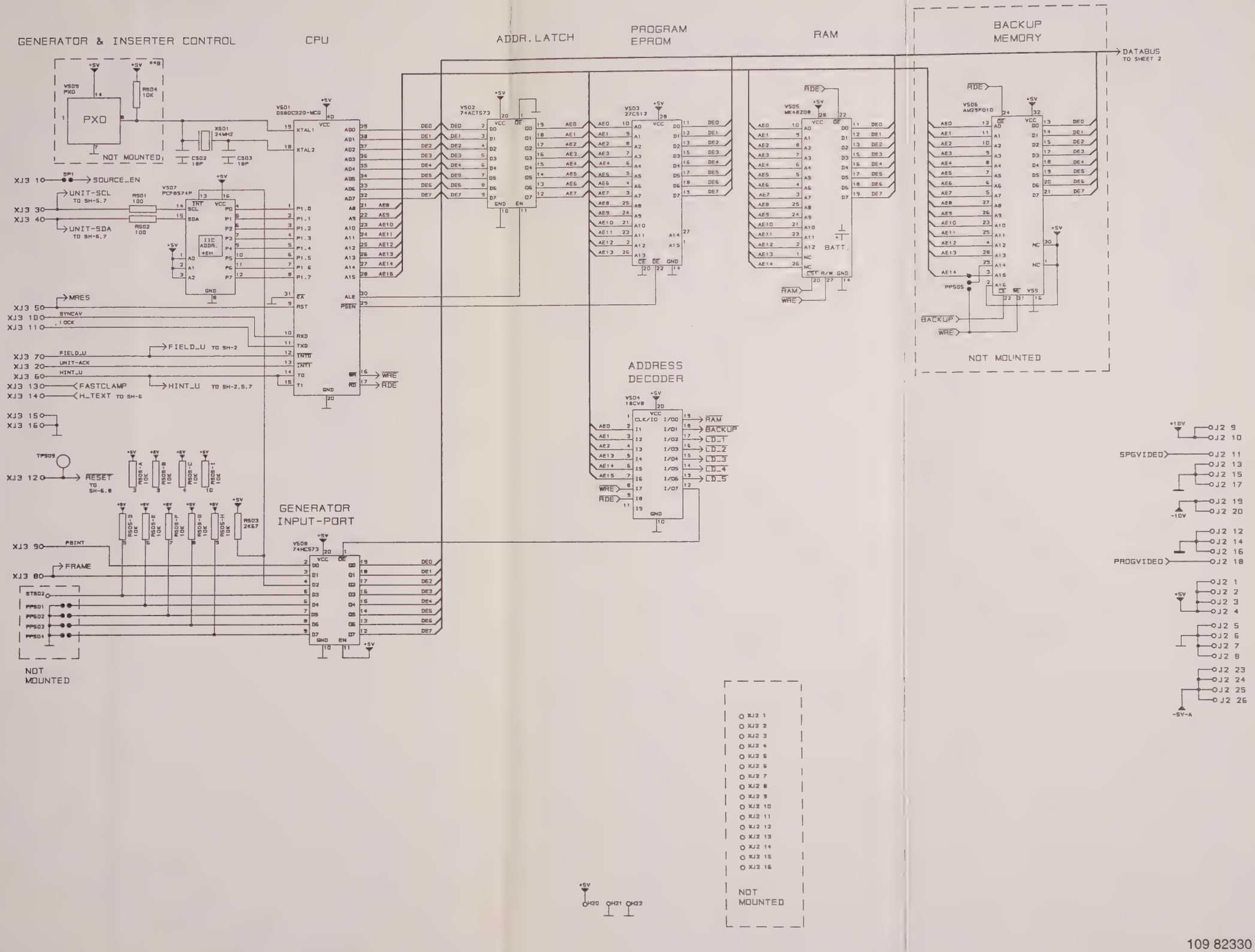


Fig. 13-9 Check points, Generator Board - Unit 2



ATTENTION

Fig. 13-10 Component location, Generator Board - Unit 2



109 82330

Fig. 13-11 Circuit diagram, Generator Board - Unit 2, sh.1

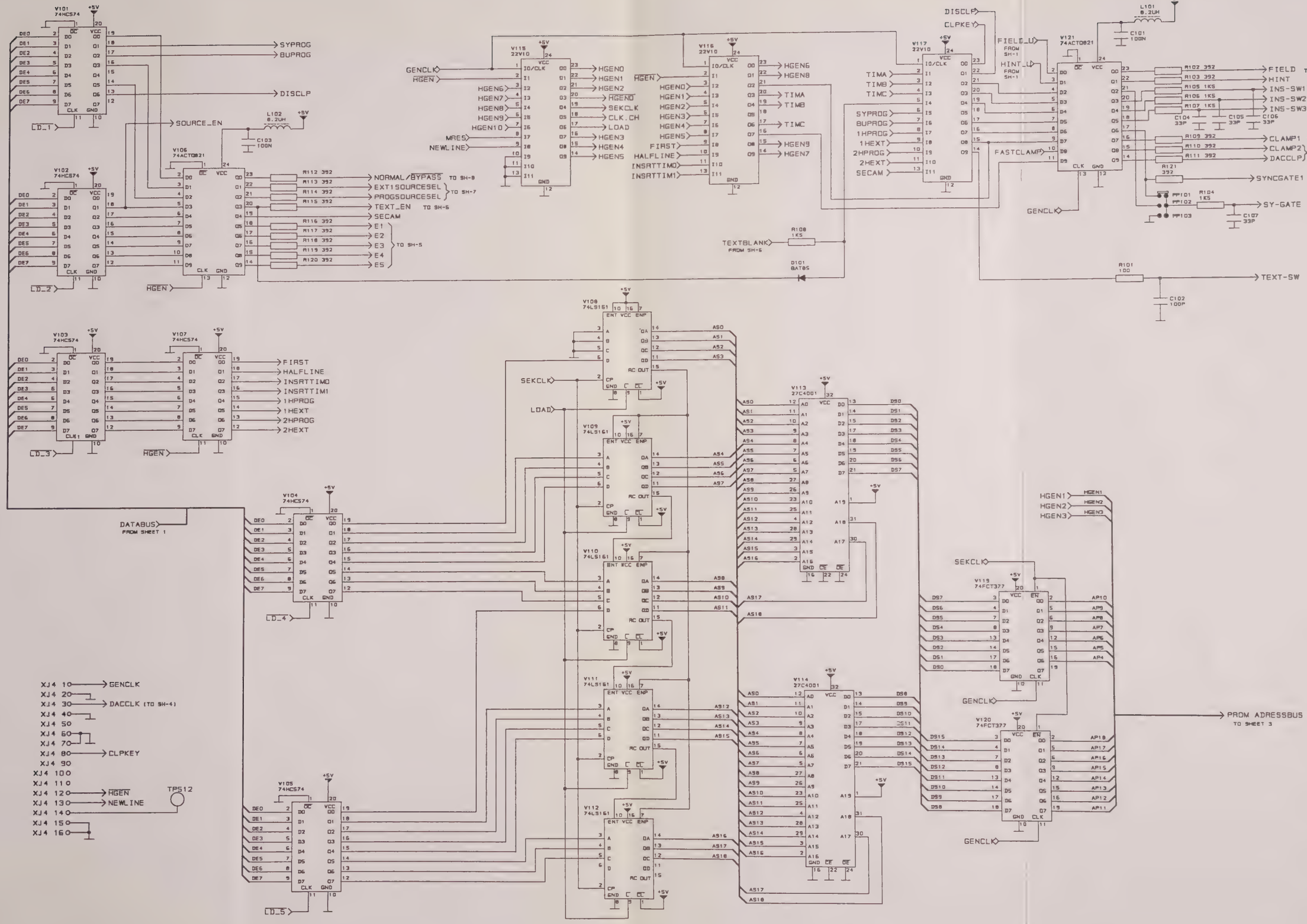


Fig. 13-12 Circuit diagram, Generator Board - Unit 2, sh.2

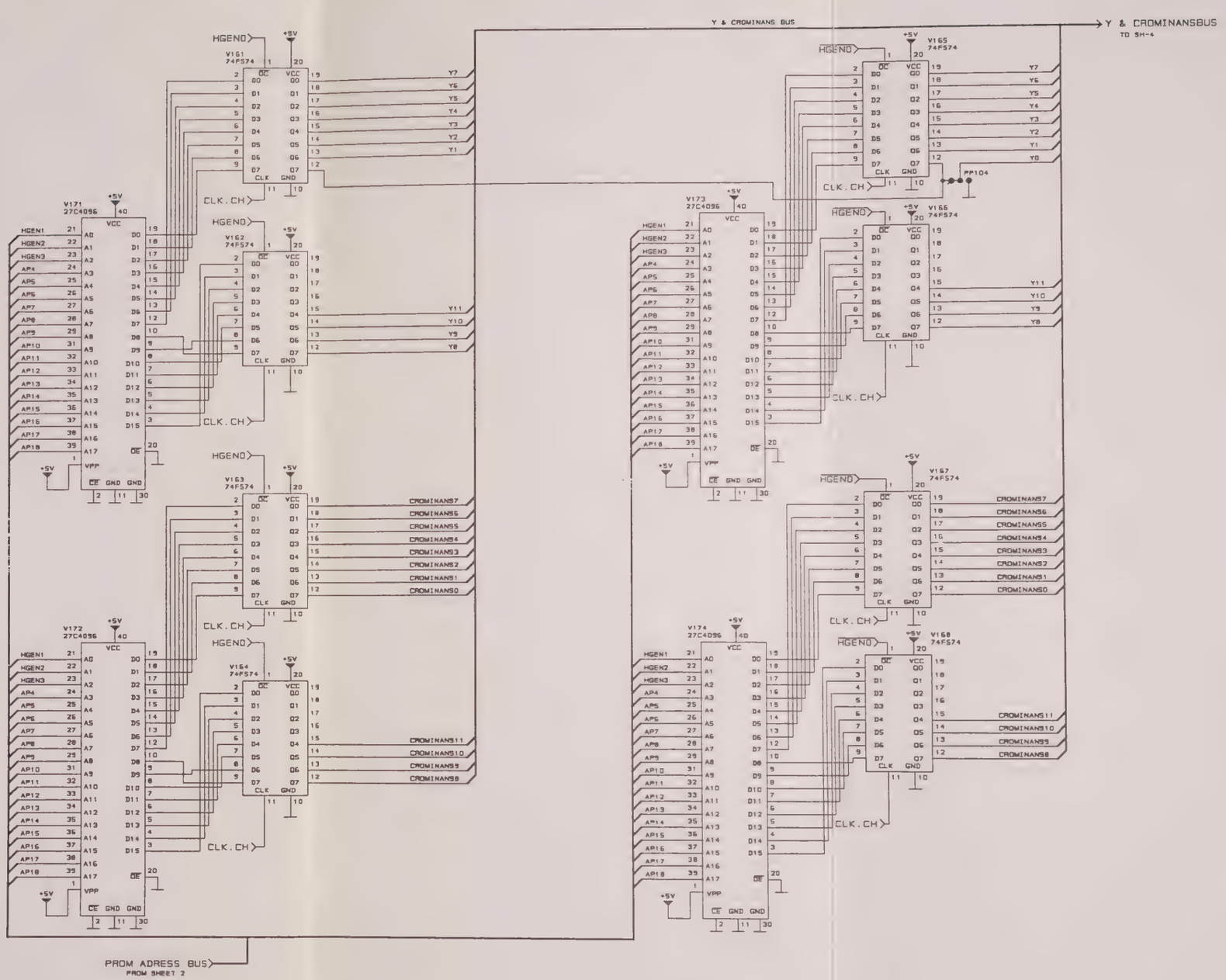


Fig. 13-13 Circuit diagram, Generator Board - Unit 2, sh.3

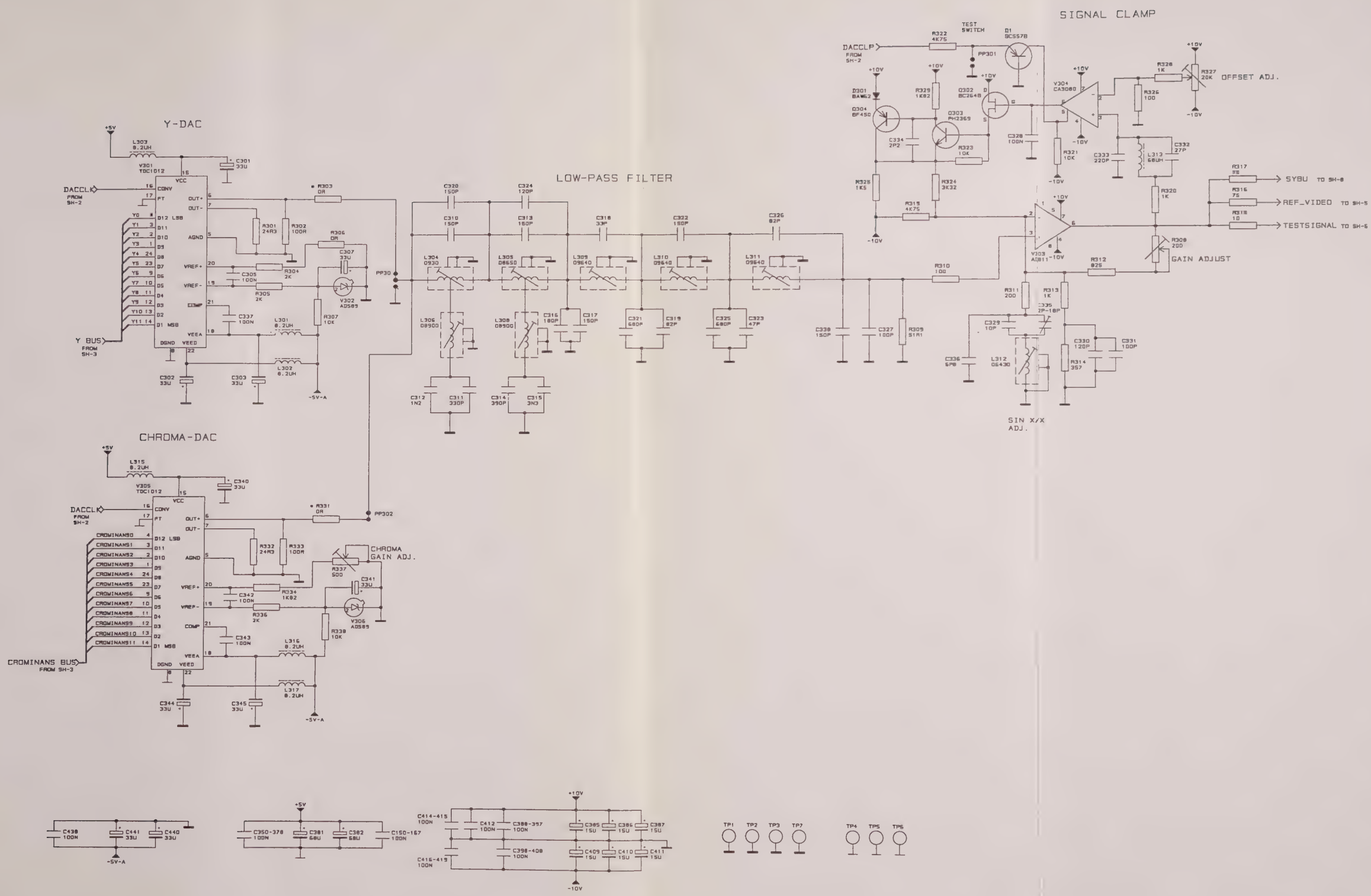


Fig. 13-14 Circuit diagram, Generator Board - Unit 2, sh.4

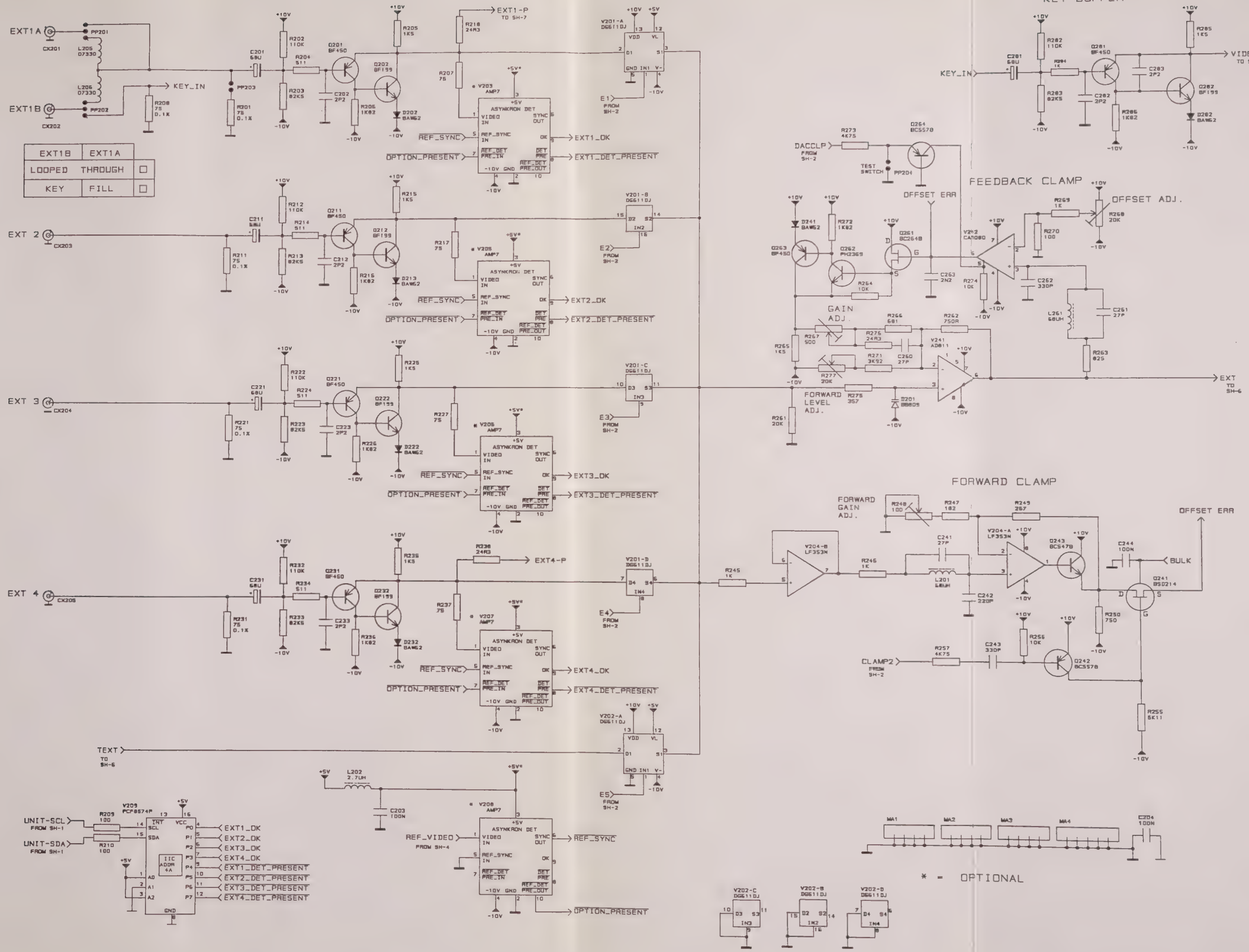


Fig. 13-15 Circuit diagram, Generator Board - Unit 2, sh.5

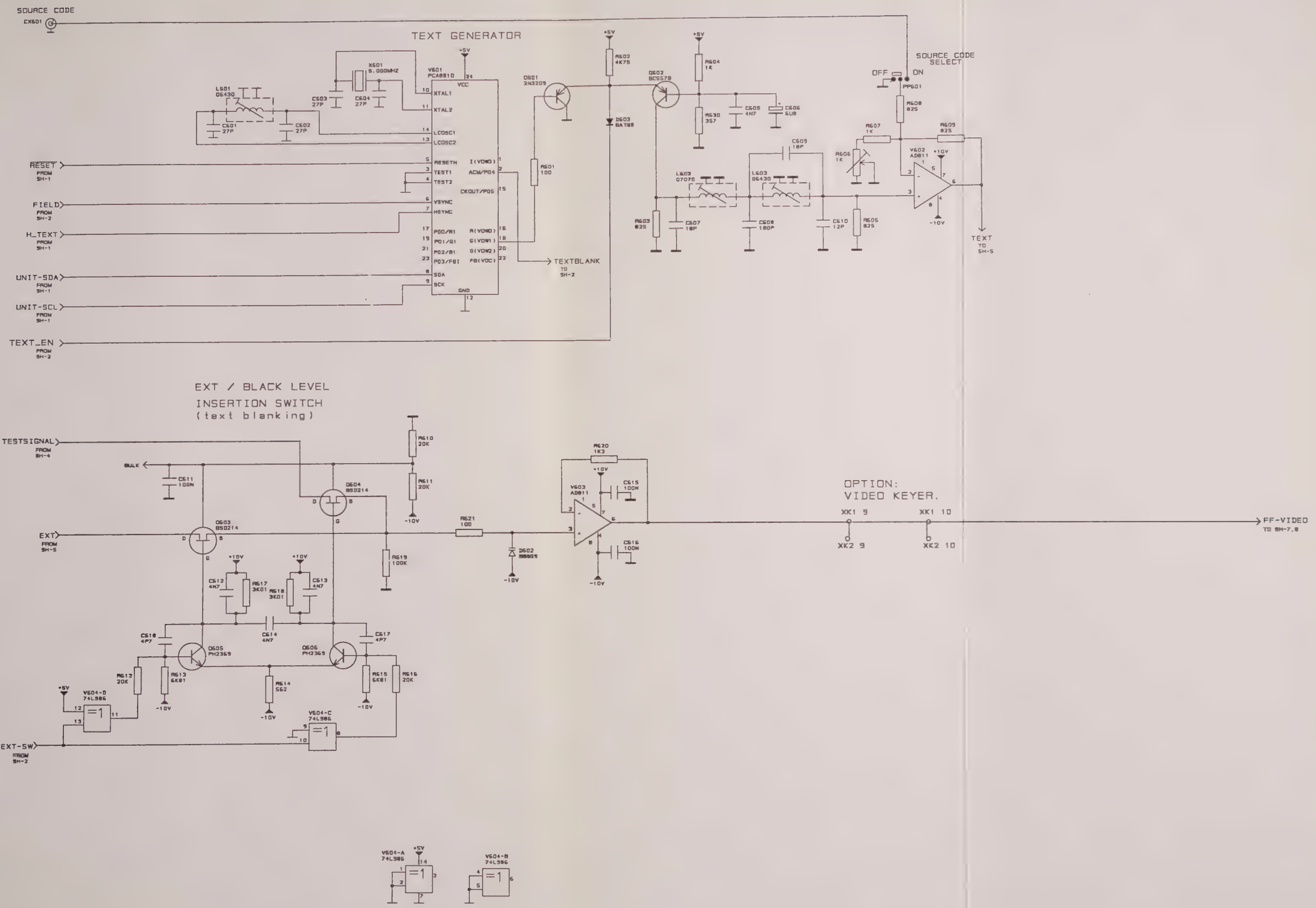


Fig. 13-16 Circuit diagram, Generator Board - Unit 2, sh.6

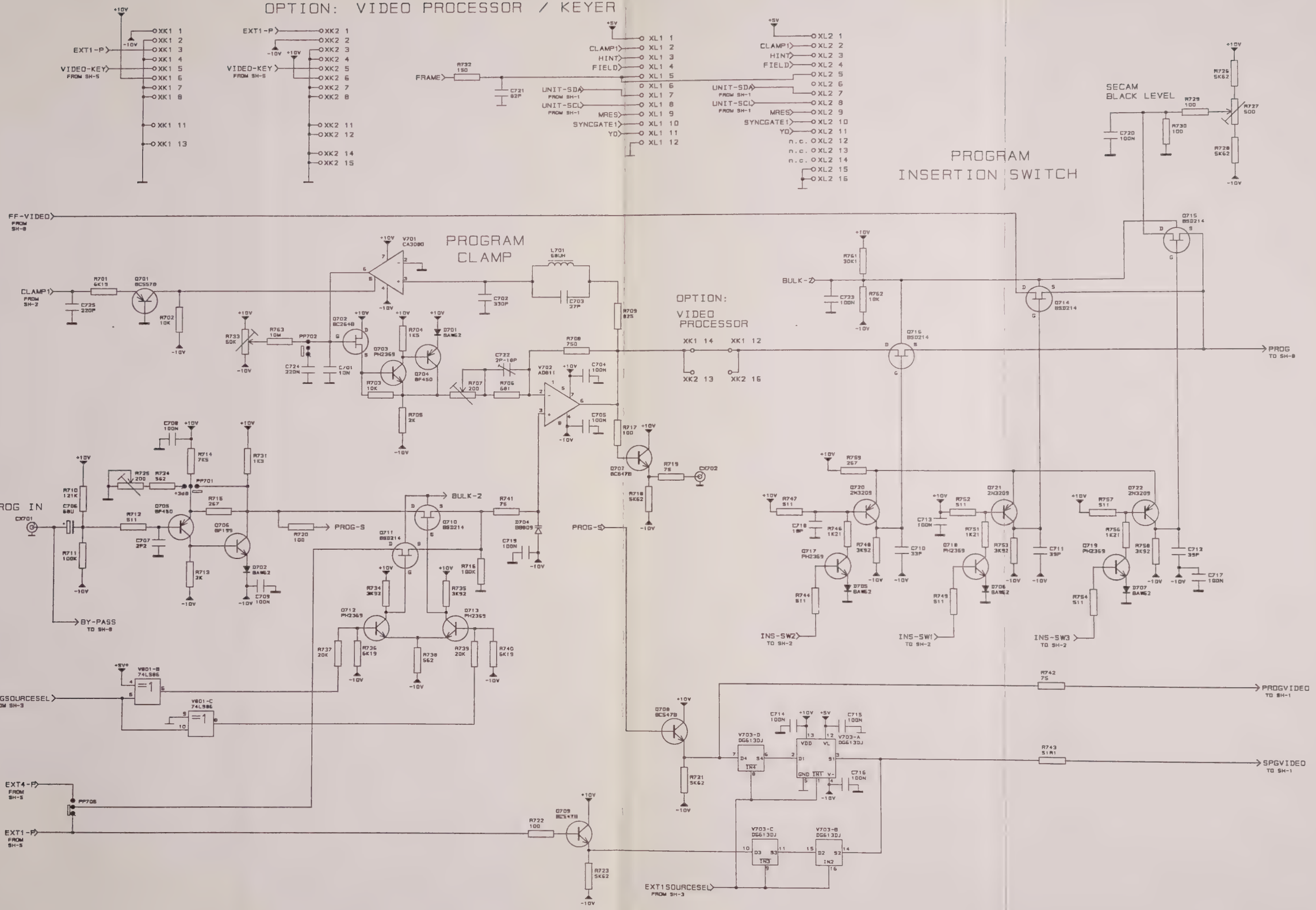


Fig. 13-17 Circuit diagram, Generator Board - Unit 2, sh.7

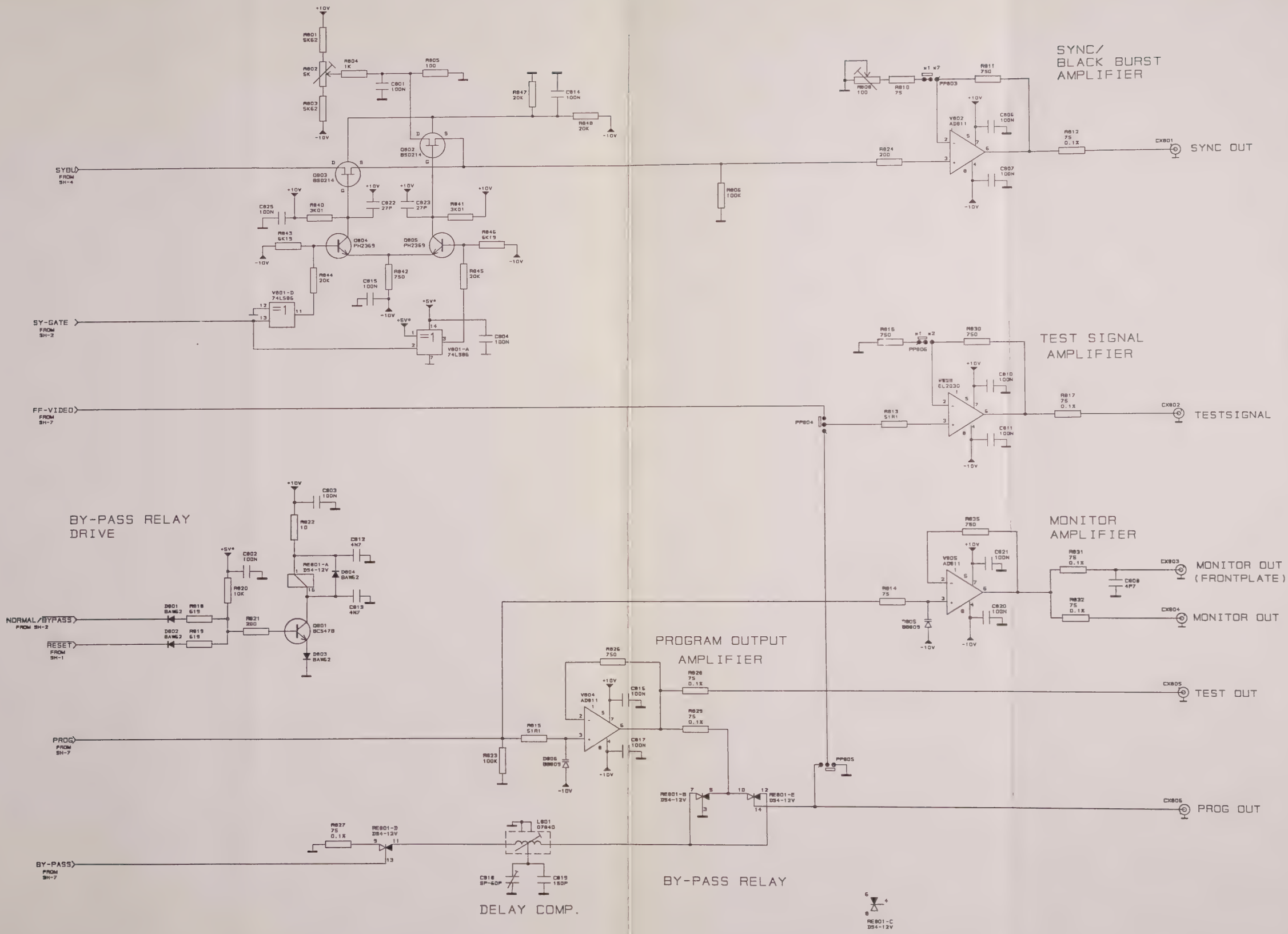
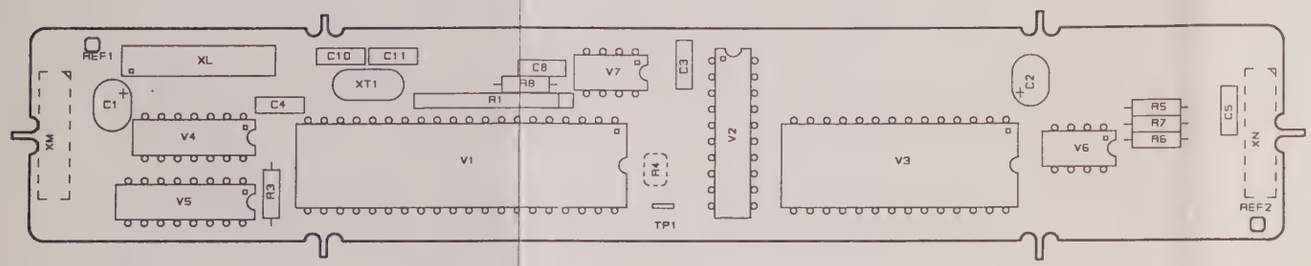


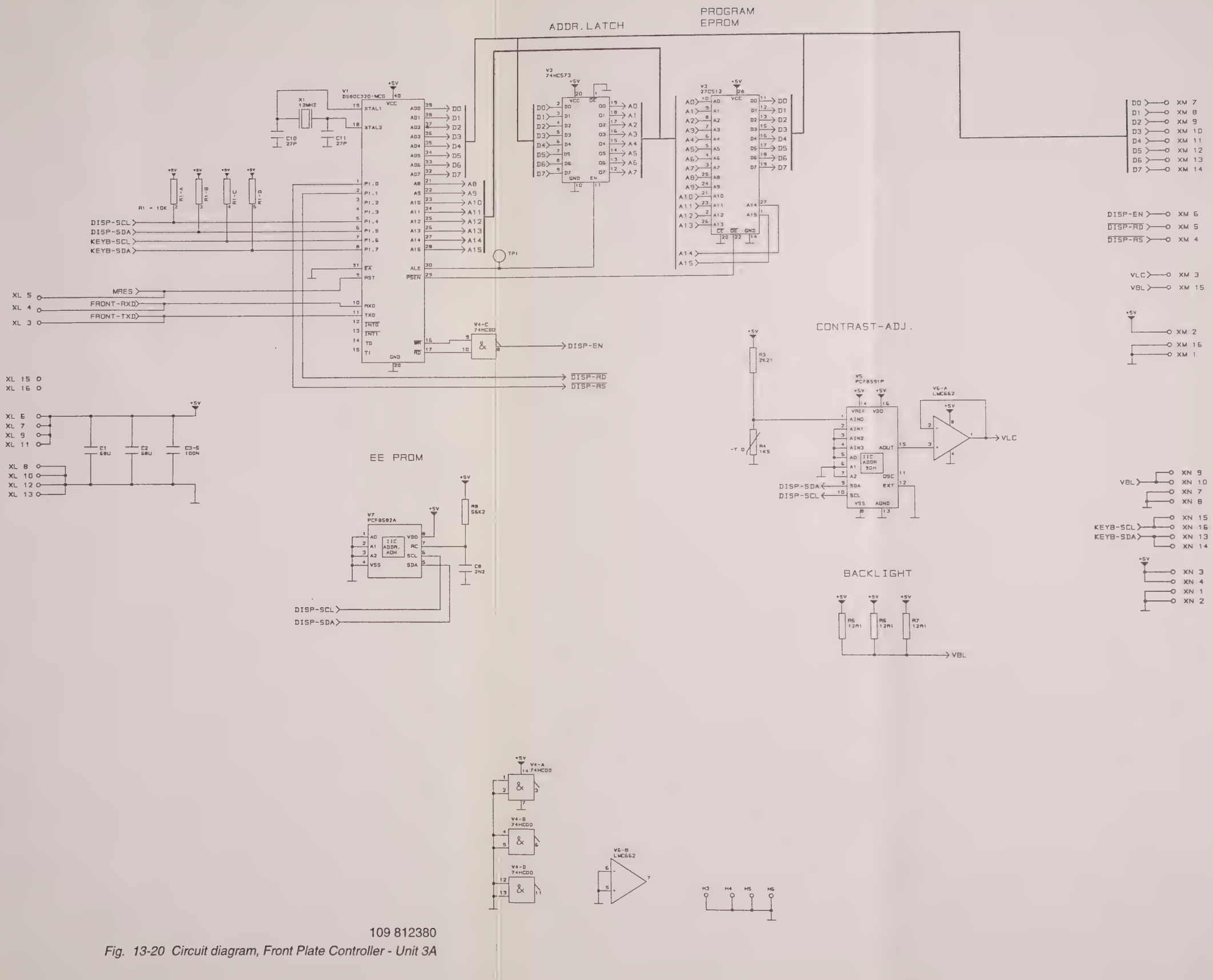
Fig. 13-18 Circuit diagram, Generator Board - Unit 2, sh.8



R4 RESISTOR MOUNTED ON SOLDER SIDE
XM & XN CONNECTORS MOUNTED ON SOLDER SIDE

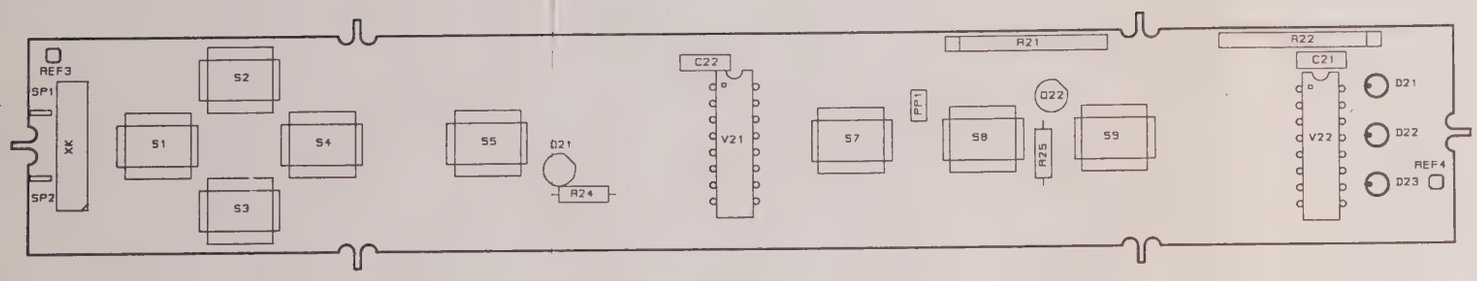
ATTENTION

Fig. 13-19 Component location, Front Plate Controller - Unit 3A



109 812380

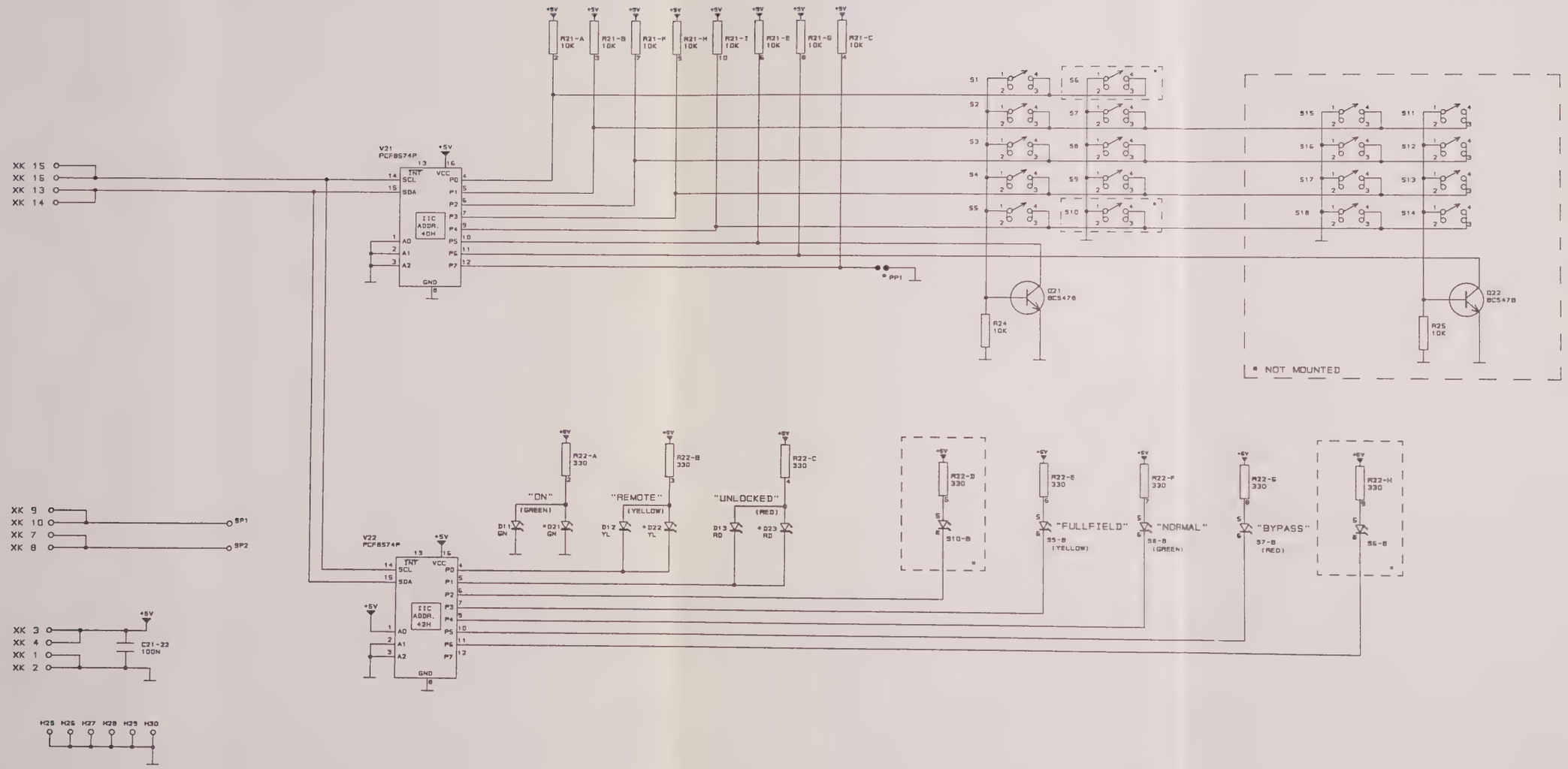
Fig. 13-20 Circuit diagram, Front Plate Controller - Unit 3A



XK MOUNTED ON SOLDER SIDE

ATTENTION

Fig. 13-21 Component location, Keyboard - Unit 3B



109 80990

Fig. 13-22 Circuit diagram, Keyboard - Unit 3B

14. RS232/V24 Interface - PM 8551/20

14.1 General Information

The RS232 interface provides the interface between an external RS232/V24 bus and the instruments internal I^2C bus.

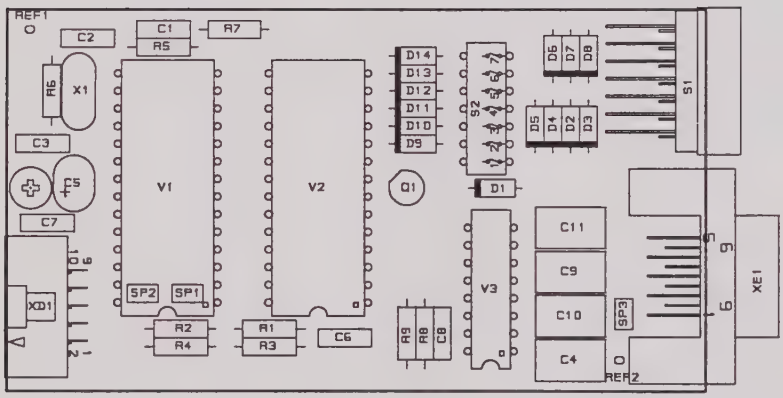
The unit is build around a single chip controller (V1), a DUART (V2), and a line driver (V3).

During output mode the controller transforms the data on I^2C bus to eight bit parallel format which can be handled by the DUART.

During input mode the controller transforms the eight bit parallel data supplied by the DUART into I^2C format.

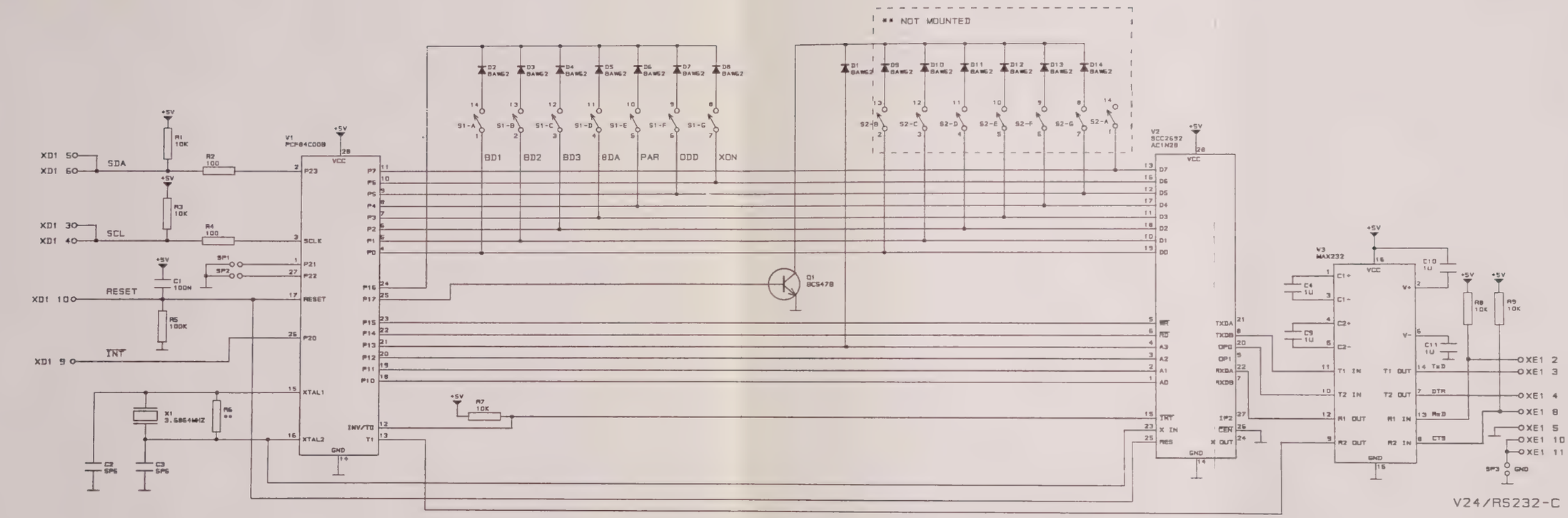
14.2 Test and Adjustments

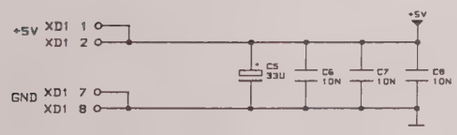
On this unit no adjustments are found.



ATTENTION

Fig. 14-1 Component location, RS232 - PM 8551/20





** NOT MOUNTED

109 81140

Fig. 14-2 Circuit diagram, RS232 - PM 8551/20

15. IEEE-488 Interface - PM 8551/30

15.1 General Information

The IEEE interface provides the interface between the IEEE bus input and the internal I^2C bus.

The main part of the unit is the CPU. This provided with a built-in 4K ROM and 128 bytes of RAM.

Port 0 (pin 4 to 11) is used as I/O-port and for reading the pre-selection switches (Address, Listen Only).

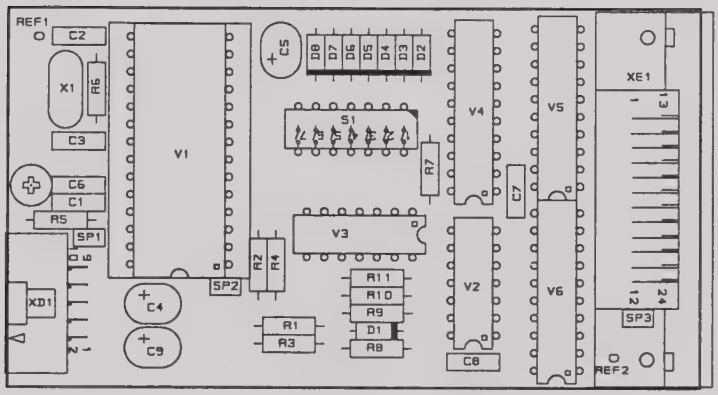
Port 1 (pin 18 to 25) is used for the IEEE control signals and to select the transmitter- or receiver function on the transceivers (V5/V6).

Pin 1 and 27 on the CPU are used for setting the I^2C bus address of the CPU.

The transceiver (V4) is used to open the connection between port 0 and the output IC (V5).

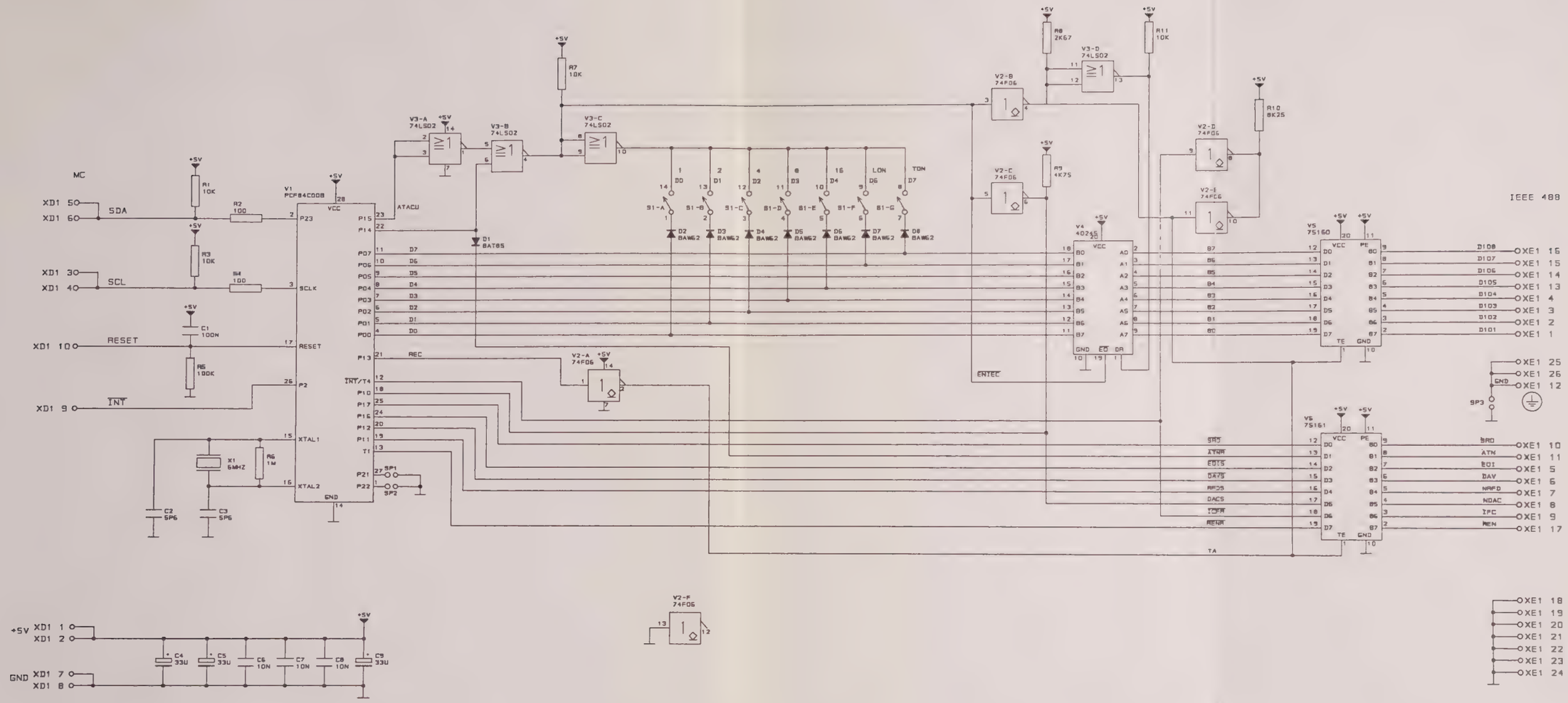
15.2 Test and Adjustments

On this unit no adjustments are found.



ATTENTION

Fig. 15-1 Component location, IEEE-488 - PM 8551/30



109 81100

Fig. 15-2 Circuit diagram, IEEE-488 - PM 8551/30

16.

This chapter is reserved for later possible additions.

17.

This chapter is reserved for later possible additions.

18.

This chapter is reserved for later possible additions.

19.

This chapter is reserved for later possible additions.

20. Asynchron Detector - PM 8557

20.1 Circuit Diagram Description

This option consist of 5 identical modules V203, V205, V206, V207, and V208.

Each module has a sync separator (V1) and an asynchron detector (built around V2 and V3).

One of the modules (V208) gets REF-VIDEO in, this is the internally generated video signal. This module then supplies the rest of the modules with reference sync (_REF_SYNC).

Each of V203, V205, V206, and V207 compares one of the external signals to the reference sync. And signals to the master controller whether or not the external input is in phase. The signalling is done via V209 and IIC bus.

20.2 Test and Adjustments

20.2.1 Performance check

Test equipment:

Waveform monitor	: e.g. Philips PM 5665
Video Generator	: e.g. Philips PM 5640A

Use a video generator with an adjustable sync output and a black burst output.

- Connect the black burst output to PROGRAM IN on PM 5655.
- Connect PROGRAM OUT from PM 5655 to a waveform monitor.
- Program video generator to insert VITS on line 17.
- Enable the 4 detectors from the front plate on the PM 5655.

- Connect the adjustable sync output to EXT 1 input on PM 5655.
- Select to insert the EXT 1 input on line 17 on PM 5655.
- With 286 mV sync on the EXT 1 input: The external input is inserted.
- With 143 mV sync on the EXT 1 input: The external input is inserted.
- With 0 mV sync on the EXT 1 input: The external input is not inserted.

- Repeat for EXT 2 - 4.

20.2.2 Adjustments

On this unit no adjustments are found.

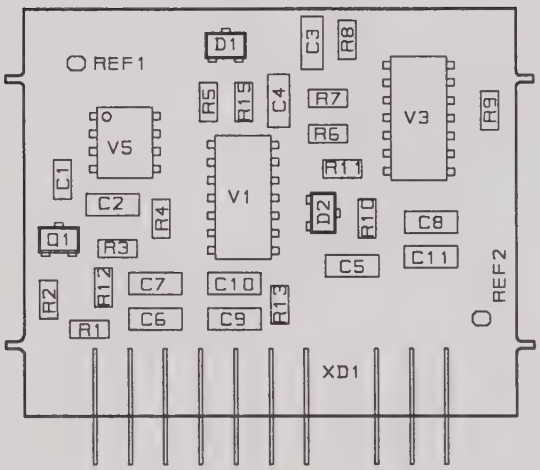


Fig. 20-1 Component location, Asynchron Detector - PM 8557

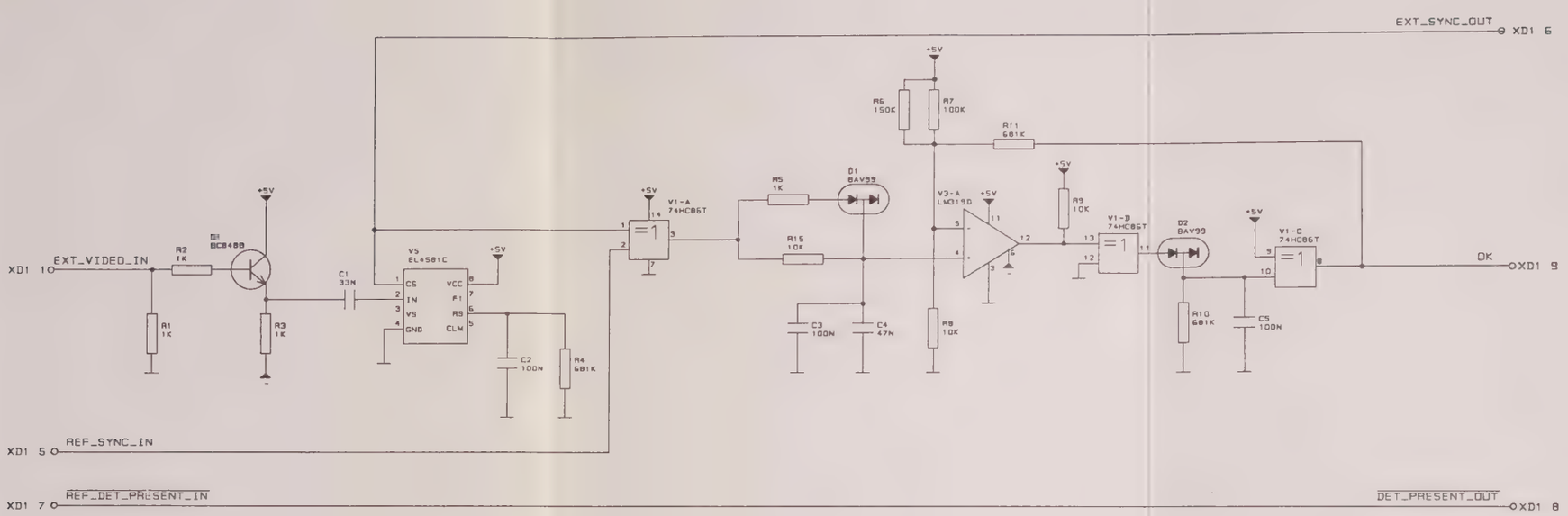


Fig. 20-2 Circuit diagram, Asynchron Detector - PM 8557

21. Service Hints

21.1 Maintenance

21.1.1 Switches

Should the switches cease to function properly due to dirty contacts, they should be treated with a switch cleaner which both cleans and lubricates. After being cleaned, the switch should be operated a number of times to distribute the cleaner evenly.

21.1.2 Cabinet

The cabinet can be cleaned with a mild detergent and water. If necessary, a fine scouring detergent may be used.

21.1.3 Repairs

If you experience problems with this equipment, please contact the local Philips sales/service organization. Our service centers have a trained staff who will provide all possible support in solving your problems.

If the instrument has to be sent to the Philips service center for repair and/or alignment, the following points should be noted:

1. Attach a label to the instrument stating the address of the sender and describing the fault(s) and complaint(s) as clearly as possible.

2. Use the original shipping carton and padding materials (if still available) or pack the instrument, wrapped in a plastic bag, in a rigid box in order to avoid transport damage.

3. The box should be marked with the complete type- and serial number (KU. number) and the remark "Return-shipment for repair".

21.2 Calibration survey

Generator Board - Unit 2

1. Check clamp-pulses from the sync pulse generator
2. Gain of program signal
3. Frequency response of program signal
4. DC-offset in electric bypass
5. Erase levels
6. Amplitude of internal generated VIT-signal
7. Sync amplitude 2V
8. Check sync amplitude 286mV
9. Sync output, blanking level
10. Check of external genlock input
11. Gain and clamp level, external inputs
12. Oscillator for the text generator
13. Text amplitude
14. Filter response, text generator
15. Low-pass filter, anti-aliasing filter
16. Check of outputs
17. Delay-equalizer NORMAL/BYPASS
18. Input Sc-H
19. Genlock phase (Sync timing)
20. Phase of inserted VIT signal

Fault analysis report

To aid us in maintaining records and in our continuing efforts to improve instrument reliability and the quality of the servicing manuals, we kindly request that you complete this fault analysis report if the instruments requires repair and/or adjustment.

Instrument type no.: PM _____ KU no. (serial no.) : _____

Estimated usage: _____ HRS/Year

Company name: _____

How many instruments of this type does your company use? _____

Please give a short description of the fault/symptoms:

_____

_____

_____

What was the cause? (Failed component, mis-adjustment etc).:

_____

_____

Time taken to repair/adjust __ HRS.

Does your company/organization normally?:

☐ Repair self ☐ Send the instrument to Philips Customer Support

When fault-finding/making adjustments, did you find the manual:

☐ Excellent? ☐ Adequate?

☐ Very good? ☐ Poor?

☐ Good? ☐ Very poor?

Do you have any suggestions that you think would improve future servicing manuals:

_____

_____

Have you any other suggestions/complains:

_____

_____

Please cut along the line and send this report to the Philips Customer Support Organization in your country.

22. List of Mechanical Parts

Item:	Ordering Number:	Description:
1	5322 447 92319	FRONT PLATE
2	5322 410 50174	SWITCH
3	5322 410 50176	SWITCH
4	5322 410 50175	SWITCH
5	5322 130 91263	DISPLAY
6	5322 264 10271	CONNECTOR
7	5322 498 50333	HANDLE ASSY
8	5322 447 92316	TOP COVER
9	5322 447 92321	BOTTOM/REAR PLATE
10	5322 264 10272	BNC CONNECTOR
11	5322 264 61051	TTL CONNECTOR
12	5322 361 10726	FAN - 20mm
13	5322 458 10447	METAL GUARD FOR FAN
14	5322 277 11337	MAINS SWITCH
15	5322 290 60432	MAINS CONNECTOR
16	5322 455 71099	LABEL FOR MAINS CONN
17	5322 447 92315	COVER PLATE
	4822 253 50046	FUSE 1A

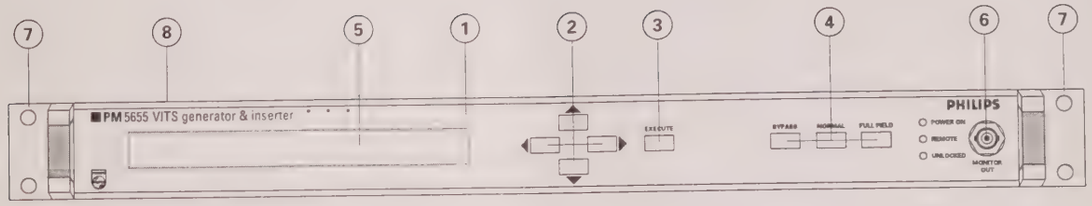


Fig. 22-1 Front of the instrument

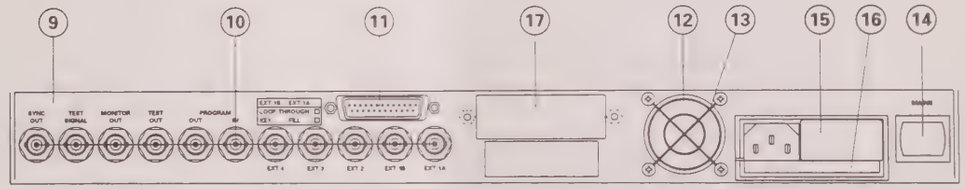


Fig. 22-2 Rear of the instrument

23. List of Electrical Parts

Standard resistors (MR25, 0.4W, 1% and CHIP0805, 1W, 0.5%) are found on the "List of Standard Resistors" at the end of this chapter.

Unit 1 - Power Supply

Item	Ordering Number	Description
Integrated Circuits		
V1	5322 209 33685	74ACT0573P
V2	4822 209 80525	CA3080E
V3	5322 209 33676	AD9048JQ
V4	5322 209 83228	LM337LZ
V5	5322 209 52881	PROG PLD
V6	5322 209 52882	PROG PLD
V7	5322 209 52883	PROG PLD
V8	4822 209 80525	CA3080E
V9	5322 209 12569	AD811AN
V10	5322 209 81395	LF353N
V25	5322 209 10883	PCF8574P
V26	5322 209 52593	DS80C320MCG
V28	5322 209 11342	74HC574N
V29	5322 209 11342	74HC574N
V30	5322 209 11342	74HC574N
V31	5322 209 11342	74HC574N
V32	5322 209 11342	74HC574N
V33	5322 209 52884	PROG PROM
V34	5322 209 52629	PROG. PLD
V35	5322 209 52592	CY7C132-30PC
V50	5322 209 63816	AD7537JN
V51	5322 209 80903	LM78L05ACZ
V52	5322 209 81395	LF353N
V53	5322 209 82943	LM317LZ
V54	5322 209 83228	LM337LZ
V56	5322 209 11323	74HCU04N
V57	5322 209 81395	LF353N
V58	4822 209 80591	LM317T
V59	5322 209 12574	74ABT245N
V60	5322 209 52885	PROG PLD
V61	5322 209 52886	PROG PLD
V62	5322 209 52887	PROG PROM
V63	5322 209 80903	LM78L05ACZ
V64	5322 209 33679	DG611DJ
V65	5322 209 11473	74HC86N
V66	5322 209 85503	LM311N
V301	5322 209 33682	L296
V302	5322 209 32559	LT1070CT
V304	4822 209 80591	LM317T
V305	5322 209 81236	LM337T
V306	5322 209 81236	LM337T
V550	5322 209 10883	PCF8574P
V560	5322 209 10883	PCF8574P
V570	5322 209 10883	PCF8574P
V580	5322 209 80903	LM78L05ACZ
V601	4822 209 62476	PCB80C31BH
V602	5322 209 12535	MAX693ACPE
V603	5322 209 52888	PROG PROM
V604	5322 209 52594	MK48Z08B-10
V606	5322 209 11738	PCF8591P
V607	5322 209 83271	74HC573N
V608	5322 209 62691	LT1086CT
Transistors		
Q3	4822 130 44568	BC557B
Q4	4822 130 44568	BC557B
Q5	5322 130 44418	BF256A
Q50	4822 130 40959	BC547B
Q301	4822 130 44568	BC557B
Q390	4822 130 44568	BC557B
Q391	4822 130 40959	BC547B
Q601	4822 130 40959	BC547B
Q603	4822 130 40959	BC547B
Diodes		
D1	4822 130 31983	BAT85
D2	4822 130 31983	BAT85
D50	4822 130 30613	BAW62
D51	4822 130 30613	BAW62
D52	5322 130 30742	1N825A
D53	5322 130 30742	1N825A
D54	4822 130 30613	BAW62
D301	5322 130 80285	SB360
D303	5322 130 80285	SB360
D304	5322 130 80285	SB360
D307	5322 130 80285	SB360
D308	5322 130 80285	SB360
D309	5322 130 80285	SB360
D390	4822 130 30613	BAW62
D576	4822 130 31983	BAT85
Crystals		
X041	5322 466 91019	24,000MHz
X061	4822 242 71663	12,000000MHz
A1	5322 242 82254	OCXO 14.318180MHZ
Relay		
RE001	5322 280 60469	12V DS4-E-M-DC
Capacitors		
C1	4822 122 31316	N10 +-2% 100V CERAMI
C2	4822 122 31237	82P +-2% 100V CERAMI
C3	4822 122 31353	N33 +-2% 100V CERAMI
C4	4822 122 31353	68P +-2% 100V CERAMI
C5	4822 121 42408	220N +-10% 63V FOIL
C6	5322 124 11084	33U +-20% 10V TANTAL
C7	5322 124 11084	33U +-20% 10V TANTAL
C10	5322 124 11084	33U +-20% 10V TANTAL
C11	5322 124 11084	33U +-20% 10V TANTAL
C12	5322 124 11084	33U +-20% 10V TANTAL
C13	5322 124 11084	33U +-20% 10V TANTAL
C14	5322 124 10695	15U +-20% 16V TANTAL
C15	5322 124 10695	15U +-20% 16V TANTAL

Item	Ordering Number	Description
C16	5322 121 42386	100N +-10% 63V FOIL
C17	5322 121 42386	100N +-10% 63V FOIL
C18	5322 124 14078	1U5 +-20% 40V TANTAL
C19	5322 121 54071	2N2 +-1% 250V POLYS.
C20	5322 122 32056	N22 +-2% 100V CERAM.
C21	4822 122 31349	68P +-2% 100V CERAM.
C22	5322 122 32143	22P +-2% 100V CERAM.
C23	5322 121 42386	100N +-10% 63V FOIL
C24	5322 121 42386	100N +-10% 63V FOIL
C25	5322 121 42386	100N +-10% 63V FOIL
C26	5322 121 42386	100N +-10% 63V FOIL
C27	4822 122 31061	18P +-2% 100V CERAM.
C28	4822 122 31061	18P +-2% 100V CERAM.
C50	5322 121 42386	100N +-10% 63V FOIL
C51	5322 121 42386	100N +-10% 63V FOIL
C53	4822 122 32193	33P +-2% 100V CERAM.
C54	4822 122 31316	N10 +-2% 100V CERAM.
C55	5322 121 42498	680N +-10% 63V FOIL.
C56	4822 122 31316	N10 +-2% 100V CERAM.
C57	4822 122 31316	N10 +-2% 100V CERAM.
C58	5322 121 42386	100N +-10% 63V FOIL.
C59	5322 121 42386	100N +-10% 63V FOIL.
C60	5322 124 10695	15U +-20% 16V TANTAL
C61	5322 124 11084	33U +-20% 10V TANTAL
C62	5322 124 11084	33U +-20% 10V TANTAL
C63	5322 121 42386	100N +-10% 63V FOIL
C64	5322 121 42386	100N +-10% 63V FOIL
C65	5322 121 42386	100N +-10% 63V FOIL
C66	5322 121 42386	100N +-10% 63V FOIL
C67	5322 121 42498	680N +-10% 63V FOIL
C68	4822 121 41857	10N +-10% 250V FOIL
C301	5322 121 42386	100N +-10% 63V FOIL
C302	5322 121 42386	100N +-10% 63V FOIL
C303	5322 124 80825	3300UF +-20% 40V ELC
C304	5322 124 80825	3300UF +-20% 40V ELC
C305	5322 121 42498	680N +-10% 63V FOIL
C306	5322 124 40852	100U +-20% 35V ELCO
C307	5322 121 42498	680N +-10% 63V FOIL
C308	5322 124 80825	3300UF +-20% 40V ELC
C309	5322 124 40852	100U +-20% 35V ELCO
C310	4822 124 20947	3U3 +-20% 16V TANTAL
C311	4822 122 31353	N33 +-2% 100V CERAM.
C312	5322 121 42489	33N +-10% 100V FOIL.
C313	5322 121 54071	2N2 +-1% 250V POLYS.
C314	4822 124 20947	3U3 +-20% 16V TANTAL
C315	5322 124 40852	100U +-20% 35V ELCO
C316	4822 124 40196	220U +-20% 16V ELCO
C317	4822 124 40196	220U +-20% 16V ELCO
C318	5322 121 42386	100N +-10% 63V FOIL
C319	5322 121 42386	100N +-10% 63V FOIL
C320	5322 121 42386	100N +-10% 63V FOIL
C321	5322 121 42386	100N +-10% 63V FOIL
C322	5322 121 42386	100N +-10% 63V FOIL
C323	5322 121 42386	100N +-10% 63V FOIL
C324	5322 121 42386	100N +-10% 63V FOIL
C325	5322 121 42386	100N +-10% 63V FOIL
C326	5322 121 42386	100N +-10% 63V FOIL
C327	5322 121 42386	100N +-10% 63V FOIL
C328	5322 121 42386	100N +-10% 63V FOIL

Item	Ordering Number	Description
C329	5322 121 42386	100N +-10% 63V FOIL
C330	5322 124 14081	6U8 +-20% 25V TANTAL
C331	5322 124 14081	6U8 +-20% 25V TANTAL
C332	5322 124 14081	6U8 +-20% 25V TANTAL
C333	5322 124 14081	6U8 +-20% 25V TANTAL
C334	5322 124 14081	6U8 +-20% 25V TANTAL
C335	5322 124 40852	100U +-20% 35V ELCO
C336	4822 124 20947	3U3 +-20% 16V TANTAL
C337	5322 124 40852	100U +-20% 35V ELCO
C338	5322 124 40852	100U +-20% 35V ELCO
C339	5322 124 14081	6U8 +-20% 25V FOIL
C340	5322 121 42386	100N +-10% 63V FOIL
C341	5322 124 11084	33U +-20% 10V TANTAL
C342	5322 124 11084	33U +-20% 10V TANTAL
C343	5322 121 42386	100N +-10% 63V FOIL
C344	5322 124 10695	15U +-20% 16V TANTAL
C345	5322 121 42386	100N +-10% 63V FOIL
C346	5322 121 42386	100N +-10% 63V FOIL
C347	5322 121 42386	100N +-10% 63V FOIL
C348	5322 124 10695	15U +-15% 16V TANTAL
C349	5322 121 42386	100N +-10% 63V FOIL
C350	5322 121 42386	100N +-10% 63V FOIL
C351	5322 121 42386	100N +-10% 63V FOIL
C352	5322 121 42386	100N +-10% 63V FOIL
C390	5322 121 42386	100N +-10% 63V FOIL
C391	5322 121 42386	100N +-10% 63V FOIL
C395	5322 124 40852	100U +-20% 35V ELCO
C396	5322 124 14081	6U8 +-20% 25V TANTAL
C551	5322 122 32331	1N0+-10% 100V CERM.
C552	5322 122 32331	1N0+-10% 100V CERM.
C553	5322 122 32331	1N0+-10% 100V CERM.
C554	5322 122 32331	1N0+-10% 100V CERM.
C555	5322 122 32331	1N0 +-10% 100V CERM.
C556	5322 122 32331	1N0 +-10% 100V CERM.
C557	5322 122 32331	1N0 +-10% 100V CERM.
C558	5322 122 32331	1N0 +-10% 100V CERM.
C561	5322 122 32331	1N0 +-10% 100V CERM.
C562	5322 122 32331	1N0 +-10% 100V CERM.
C563	5322 122 32331	1N0 +-10% 100V CERM.
C564	5322 122 32331	1N0 +-10% 100V CERM.
C565	5322 122 32331	1N0 +-10% 100V CERM.
C566	5322 122 32331	1N0 +-10% 100V CERM.
C567	5322 122 32331	1N0 +-10% 100V CERM.
C568	5322 122 32331	1N0 +-10% 100V CERM.
C571	5322 122 32331	1N0 +-10% 100V CERM.
C572	5322 122 32331	1N0 +-10% 100V CERM.
C573	5322 122 32331	1N0 +-10% 100V CERM.
C574	5322 122 32331	1N0 +-10% 100V CERM.
C575	5322 122 32331	1N0 +-10% 100V CERM.
C576	5322 122 32331	1N0 +-10% 100V CERM.
C577	5322 122 32331	1N0 +-10% 100V CERM.
C578	5322 122 32331	1N0 +-10% 100V CERM.
C602	5322 124 14081	6U8 +-20% 25V TANTAL
C603	5322 121 42386	100N +-10% 63V FOIL
C604	4822 122 30045	27P +-2% 100V CERAMI
C605	4822 122 30045	27P +-2% 100V CERAMI
C606	5322 124 14078	1U5 +-20% 40V TANTAL

Item	Ordering Number	Description
Resistors		
R32	4822 053 20106	10M 5% 0,25W VR25
R83	5322 101 11146	50K 10% 0,5W TRIMPOT
R94	4822 053 20106	10M 5% 0,25W VR25
R551	5322 111 91609	9X2K7 2% NETW.
R552	4822 111 91953	5X1K 2% NETW.
R553	4822 111 91953	5X1K 2% NETW.
R561	5322 111 91609	9X2K7 2% NETW.
R562	4822 111 91953	5X1K 2% NETW.
R563	4822 111 91953	5X1K 2% NETW.
R571	5322 111 91609	9X2K7 2% NETW.
R572	4822 111 91953	5X1K 2% NETW.
R573	4822 111 91953	5X1K 2% NETW.
R611	4822 116 30248	1K5 5% 0,5W NTC
R612	5322 111 90431	9X10K 2% NETW.

Unit 2 - Generator Board

Integrated Circuits		
V101	5322 209 11342	74HC574
V102	5322 209 11342	74HC574
V103	5322 209 11342	74HC574
V104	5322 209 11342	74HC574
V105	5322 209 11342	74HC574
V106	5322 209 12551	74ACTQ821
V107	5322 209 11342	74HC574N
V108	5322 209 11337	74HC161N
V109	5322 209 11337	74HC161N
V110	5322 209 11337	74HC161N
V111	5322 209 11337	74HC161N
V112	5322 209 11337	74HC161N
V113	5322 209 52869	PROG PROM
V114	5322 209 52871	PROG PROM
V115	5322 209 52872	PROG PLD
V116	5322 209 52873	PROG PLD
V117	5322 209 52874	PROG PLD
V119	5322 209 12577	IDT74FCT377ATP
V120	5322 209 12577	IDT74FCT377ATP
V121	5322 209 12551	74ACTQ821
V161	4822 209 62799	74F574N
V162	4822 209 62799	74F574N
V163	4822 209 62799	74F574N
V164	4822 209 62799	74F574N
V165	4822 209 62799	74F574N
V166	4822 209 62799	74F574N
V167	4822 209 62799	74F574N
V168	4822 209 62799	74F574N
V171	5322 209 52875	PROG PROM
V172	5322 209 52877	PROG PROM
V173	5322 209 52876	PROG PROM
V174	5322 209 52878	PROG PROM
V201	5322 209 33679	DG611DJ
V202	5322 209 33679	DG611DJ
V204	5322 209 81395	LF353N
V209	5322 209 10883	PCF8574P
V241	5322 209 12569	AD811AN
V242	4822 209 80525	CA3080E
V301	5322 209 33678	TDC1012N7C3
V302	5322 130 83435	AD589JH
V303	5322 209 12569	AD811AN
V304	4822 209 80525	CA3080E
V305	5322 209 63002	TDC1012N7C1
V306	5322 130 83435	AD589JH
V501	5322 209 52593	DS80C320MCG
V502	5322 209 33685	74ACTQ573P
V503	5322 209 52879	PROG PROM
V504	5322 209 52615	PROG. PLD
V505	5322 209 52868	M48Z32-85PC1
V507	5322 209 10883	PCF8574P
V508	5322 209 83271	74HC573N
V601	5322 209 33683	PCA8510P/003
V602	5322 209 12569	AD811AN
V603	5322 209 12569	AD811AN
V604	5322 209 73836	74LS86N
V701	4822 209 80525	CA3080E
V702	5322 209 12569	AD811AN
V703	5322 209 33681	DG613DJ
V801	5322 209 73836	74LS86N
V802	5322 209 12569	AD811AN
V803	5322 209 12547	EL2030CN
V804	5322 209 12569	AD811AN
V805	5322 209 12569	AD811AN
Transistors		
Q1	4822 130 44568	BC5557B
Q201	4822 130 44237	BF450
Q202	4822 130 44154	BF199
Q211	4822 130 44237	BF450
Q212	4822 130 44154	BF199
Q221	4822 130 44237	BF450
Q222	4822 130 44154	BF199
Q231	4822 130 44237	BF450
Q232	4822 130 44154	BF199
Q241	5322 130 42405	BSD214
Q242	4822 130 44568	BC557B
Q243	4822 130 40959	BC547B
Q261	5322 130 44476	BC264A
Q262	4822 130 41594	PH2369
Q263	4822 130 44237	BF450
Q264	4822 130 44568	BC557B
Q281	4822 130 44237	BF450
Q282	4822 130 44154	BF199
Q302	5322 130 44476	BC264A
Q303	4822 130 41594	PH2369
Q304	4822 130 44237	BF450
Q601	5322 130 44609	2N3209
Q602	4822 130 44568	BC557B
Q603	5322 130 42405	BSD214
Q604	5322 130 42405	BSD214
Q605	4822 130 41594	PH2369
Q606	4822 130 41594	PH2369
Q701	4822 130 44568	BC557B
Q702	5322 130 44476	BC264A
Q703	4822 130 41594	PH2369
Q704	4822 130 44237	BF450
Q705	4822 130 44237	BF450
Q706	4822 130 44154	BF199

Item	Ordering Number	Description
Q707	4822 130 40959	BC547B
Q708	4822 130 40959	BC547B
Q709	4822 130 40959	BC547B
Q710	5322 130 42405	BSD214
Q711	5322 130 42405	BSD214
Q712	4822 130 41594	PH2369
Q713	4822 130 41594	PH2369
Q714	5322 130 42405	BSD214
Q715	5322 130 42405	BSD214
Q716	5322 130 42405	BSD214
Q717	4822 130 41594	PH2369
Q718	4822 130 41594	PH2369
Q719	4822 130 41594	PH2369
Q720	5322 130 44609	2N3209
Q721	5322 130 44609	2N3209
Q722	5322 130 44609	2N3209
Q801	4822 130 40959	BC547B
Q802	5322 130 42405	BSD214
Q803	5322 130 42405	BSD214
Q804	4822 130 41594	PH2369
Q805	4822 130 41594	PH2369
Diodes		
D101	4822 130 31983	BAT85
D201	5322 130 31684	BB809
D202	4822 130 30613	BAW62
D213	4822 130 30613	BAW62
D222	4822 130 30613	BAW62
D232	4822 130 30613	BAW62
D241	4822 130 30613	BAW62
D282	4822 130 30613	BAW62
D301	4822 130 30613	BAW62
D603	4822 130 31983	BAT85
D701	4822 130 30613	BAW62
D702	4822 130 30613	BAW62
D704	5322 130 31684	BB809
D705	4822 130 30613	BAW62
D706	4822 130 30613	BAW62
D707	4822 130 30613	BAW62
D801	4822 130 30613	BAW62
D802	4822 130 30613	BAW62
D803	4822 130 30613	BAW62
D804	4822 130 30613	BAW62
D805	5322 130 31684	BB809
D806	5322 130 31684	BB809
Coils		
L304	5322 157 71923	2X 0,8UH
L305	5322 157 53615	10UH
L306	5322 157 62581	0,7UH
L308	5322 157 62581	0,7UH
L312	5322 157 51698	1,6UH
L309	5322 157 71924	1,6UH
L310	5322 157 71924	1,6UH
L311	5322 157 71924	1,6UH
L601	5322 157 51698	10UH-26UH
L602	5322 157 51825	31UH-66UH
L603	5322 157 51698	10UH-26UH
L801	5322 157 52736	2X275NH

Item	Ordering Number	Description
Crystals		
X501	5322 466 91019	24,000MHz
X601	4822 242 70362	5,000000MHz
Relay		
RE801	5322 280 60469	12V DS4-E-M-DC
Capacitors		
C101	5322 121 42386	100N +-10% 63V FOIL
C102	4822 122 31316	N10 +-2% 100V CERAM.
C103	5322 121 42386	100N +-10% 63V FOIL.
C104-7	5322 122 32072	33P +-2% 100V CERAM.
C150-9	5322 121 42386	100N +-10% 63V FOIL.
C160-7	5322 121 42386	100N +-10% 63V FOIL.
C201	5322 124 10455	68U +-20% 6,3V TANT.
C202	4822 122 31036	2P2 +-P25 100V CER.
C203	5322 121 42386	100N +-10% 63V FOIL
C204	5322 121 42386	100N +-10% 63V FOIL
C211	5322 124 10455	68U -+20% 6,3V TANT.
C212	4822 122 31036	2P2 +-P25 100V CER.
C221	5322 124 10455	68U +-20% 6,3V TAN.
C223	4822 122 31036	2P2 +-P25 100V CER.
C231	5322 124 10455	68U +-20% 6,3V TANT.
C233	4822 122 31036	2P2 +-P25 100V CER.
C241	4822 122 30045	27P +-2% 100V CER
C242	5322 122 32056	N22 +-2% 100V CER.
C243	4822 122 31353	N33 +-2% 100V CER.
C244	5322 121 42386	100N +-10% 63V FOIL
C260	4822 122 32185	10P +-2% 100V CER.
C261	4822 122 30045	27P +-2% 100V CER
C262	4822 122 31353	N33 +-2% 100V CER
C263	5322 121 54071	2N2 +-1% 250V POL.
C281	5322 124 10455	68U +-20% 6,3V TAN.
C282	4822 122 31036	2P2 +-P25 100V CER.
C301	5322 124 11084	33U +-20% 10V TANT.
C302	5322 124 11084	33U +-20% 10V TANT.
C303	5322 124 11084	33U +-20% 10V TANT.
C305	5322 121 42386	100N +-10% 63V FOIL
C307	5322 124 11084	33U +-20% 10V TANT.
C310	4822 122 31413	N15 +-2% 100V CER
C311	4822 122 31353	N33 +-2% 100V CER
C312	5322 121 54135	1N2 +-1% 630V POL.
C313	4822 122 31413	N15 +-2% 100V CER
C314	5322 121 54128	N39 +-1% 630V POL.
C315	4822 121 51154	3N9 +-1% 160V KP
C316	5322 122 31907	N18 +-2% 100V CER
C317	4822 122 31413	N15 +-2% 100V CER
C318	4822 122 32193	33P +-2% 100V CER
C319	4822 122 31505	82P +-2% 100V CER
C320	4822 122 31413	N15 +-2% 100V CER
C322	4822 122 31413	N15 +-2% 100V CER
C323	4822 122 31244	47P +-2% 100V CER
C324	5322 126 10457	N12 +-2% 100V CER.
C325	5322 121 54061	N68 +-1% 630V POLYS
C326	5322 126 10457	N12 +-2% 100V CER
C327	5322 122 32493	N10 +-2% 100V CER
C328	5322 121 42386	100N +-10% 63V FOIL
C329	4822 122 32185	10P +-2% 100V CERAM.
C330	4822 122 31348	N12 +-2% 100V CERAM.

Item	Ordering Number	Description
C331	4822 122 31316	N10 +-2% 100V CER
C332	4822 122 30045	27P +-2% 100V CER
C333	5322 122 32056	N22 +-2% 100V CERAM.
C335	5322 125 50051	2,0-18PF TRIMMER
C336	4822 122 31049	6P8 +-P25 100V CER
C337	5322 121 42386	100N +-10% 63V FOIL
C338	4822 122 31413	N15 +-2% 100V CER
C340	5322 124 11084	33U +-20% 10V TANT.
C341	5322 124 11084	33U +-20% 10V TANT.
C342	5322 121 42386	100N +-10V 63V FOIL
C343	5322 121 42386	100N +-10V 63V FOIL
C344	5322 124 11084	33U +-20% 10V TANT.
C345	5322 124 11084	33U +-20% 10V TANT.
C350-9	5322 121 42386	100N +-10% 63V FOIL
C360-9	5322 121 42386	100N +-10% 63V FOIL
C370-8	5322 121 42386	100N +-10% 63V FOIL
C381	5322 124 10455	68U +-20% 6,3V TANT.
C382	5322 124 10455	68U +-20% 6,3V TANT.
C385	5322 124 10695	15U +-20% 16V TANT.
C386	5322 124 10695	15U +-20% 16V TANT.
C387	5322 124 10695	15U +-20% 16V TANT.
C388-9	5322 121 42386	100N +-10% 63V FOIL
C390-9	5322 121 42386	100N +-10% 63V FOIL
C400-8	5322 121 42386	100N +-10% 63V FOIL
C409	5322 124 10695	15U +-20% 16V TANT.
C410	5322 124 10695	15U +-20% 16V TANT.
C411	5322 124 10695	15U +-20% 16V TANT.
C412	5322 121 42386	100N +-10% 63V FOIL
C414-9	5322 121 42386	100N +-10% 63V FOIL
C438	5322 121 42386	100N +-10% 63V FOIL
C440	5322 124 11084	33U +-10% 10V TANT.
C441	5322 124 11084	33U +-10% 10V TANT.
C502	4822 122 31061	18P +-2% 100V CERM.
C503	4822 122 31061	18P +-2% 100V CERM.
C601	4822 122 30045	27P +-2% 100V CERM.
C602	4822 122 30045	27P +-2% 100V CERM.
C603	4822 122 30045	27P +-2% 100V CERM.
C604	4822 122 30045	27P +-2% 100V CERM.
C606	5322 124 10455	68U +-20% 6,3V TANT.
C607	5322 122 34064	18P +-2% 100V CER
C608	5322 122 31907	N18 +-2% 100V CERM.
C609	5322 122 34064	18P +-2% 100V CERM.
C610	5322 126 10458	12P +-2% 100V CERM.
C611	5322 121 42386	100N +-10% 63V FOIL
C615	5322 121 42386	100N +-10% 63V FOIL
C616	5322 121 42386	100N +-10% 63V FOIL
C617	4822 122 31822	4P7 +-P25 110V CER.
C618	4822 122 31822	4P7 +-P25 100V CER.
C701	4822 121 41857	10N +-10% 250V FOIL
C702	4822 122 31353	N33 +-2% 100V CER
C703	4822 122 30045	27P +-2% 100V CER
C704	5322 121 42386	100N +-10% 63V FOIL
C705	5322 121 42386	100N +-10% 63V FOIL
C706	5322 124 10455	68U +-20% 6,3V TANT.
C707	4822 122 31036	2P2 +-P25 100V CERM.
C708	5322 121 42386	100N +-10% 63V FOIL.
C709	5322 121 42386	100N +-10% 63V FOIL.
C710	5322 122 32072	33P +-2% 100V CERM.
C711	5322 122 32072	33P +-2% 100V CERM.
C712	4822 122 31069	39P +-2% 100V CERM.
C713	5322 121 42386	100N +-10% 63V FOIL
C714	5322 121 42386	100N +-10% 63V FOIL
C715	5322 121 42386	100N +-10% 63V FOIL
C716	5322 121 42386	100N +-10% 63V FOIL
C717	5322 121 42386	100N +-10% 63V FOIL
C718	4822 122 31061	18P +-2% 100V CERM.
C719	5322 121 42386	100N +-10% 63V FOIL
C720	5322 121 42386	100N +-10% 63V FOIL
C721	4822 122 31237	82P +-2% 100V CERM.
C722	5322 125 50051	2,0-18PF TRIMMER
C723	5322 121 42386	100N +-10% 63V FOIL
C724	4822 121 42408	220N +-10% 63V FOIL
C725	5322 122 32056	N22 +-2% 100V CERM.
C801	5322 121 42386	100N +-10% 63V FOIL
C802	5322 121 42386	100N +-10% 63V FOIL
C803	5322 121 42386	100N +-10% 63V FOIL
C804	5322 121 42386	100N +-10% 63V FOIL
C806	5322 121 42386	100N +-10% 63V FOIL
C807	5322 121 42386	100N +-10% 63V FOIL
C808	4822 122 31822	4P7 +-P25 100V CERM.
C810	5322 121 42386	100N +-10% 63V FOIL
C811	5322 121 42386	100N +-10% 63V FOIL
C812	5322 122 32261	4N7 +-10% 100V CER
C813	5322 122 32261	4N7 +-10% 100V CER
C814	5322 121 42386	100N +-10% 63V FOIL.
C815	5322 121 42386	100N +-10% 63V FOIL.
C816	5322 121 42386	100N +-10% 63V FOIL.
C817	5322 121 42386	100N +-10% 63V FOIL.
C818	5322 125 54003	5P0-60P TRIMMER
C819	4822 121 50548	N12 +-1% 630V POL.
C820	5322 121 42386	100N +-10% 63V FOIL
C821	5322 121 42386	100N +-10% 63V FOIL
C822	4822 122 30045	27P +-2% 100V CERM.
C823	4822 122 30045	27P +-2% 100V CERM.
C825	5322 121 42386	100N +-10% 63V FOIL
Resistors		
R201	5322 116 53599	75R0 0,1% 0,25W MPR2
R211	5322 116 53599	75R0 0,1% 0,25W MPR2
R248	5322 101 11321	100R 10% 0,5W TRIMP.
R267	5322 101 10693	500R 10% 0,5W TRIMP.
R268	5322 101 11322	20K 10% 0,5W TRIMP.
R277	5322 101 11322	20K 10% 0,5W TRIMP.
R308	5322 100 11864	200R 10% 0,5W TRIMP
R327	5322 101 11322	20K 10% 0,5W TRIMP
R337	5322 101 10693	500R 10% 0,5W TRIMP.
R505	5322 111 90431	9X10K 2% NETW.
R606	5322 101 11066	1K0 10% 0,5W TRIMP
R707	5322 101 11321	100R 10% 0,5W TRIMP
R725	5322 100 11864	200R 10% 0,5W TRIMP
R727	5322 100 11864	200R 10% 0,5W TRIMP
R733	5322 101 11146	50K 10% 0,5W TRIMP
R763	4822 053 20106	10M 5% 0,25W VR25
R802	5322 101 10828	5K 10% 0,5W TRIMP
R808	5322 101 11321	100R 10% 0,5W TRIMP
R812	5322 116 53599	75R0 0,1% 0,25W MPR2
R817	5322 116 53599	75R0 0,1% 0,25W MPR2
R827	5322 116 53599	75R0 0,1% 0,25W MPR2

Item	Ordering Number	Description
R828	5322 116 53599	75R0 0,1% 0,25W MPR2
R831	5322 116 53599	75R0 0,1% 0,25W MPR2
R832	5322 116 53599	75R0 0,1% 0,25W MPR2

Unit 3A - Front Plate Controller

Integrated Circuits		
V1	5322 209 52609	80C32
V2	5322 209 83271	74HC573N
V3	5322 209 52889	PROG PROM
V4	5322 209 83218	74HC00N
V5	5322 209 11738	PCF8591P
V6	5322 209 12576	LMC662CN
V7	5322 209 51263	PCF8582AP
Capacitors		
C1	5322 124 10455	68U +-20% 6,3V TANT.
C2	5322 124 10455	68U +-20% 6,3V TANT.
C3	5322 121 42386	100N +-10% 63V FOIL.
C4	5322 121 42386	100N +-10% 63V FOIL.
C5	5322 121 42386	100N +-10% 63V FOIL.
C8	5322 122 32818	2N2 +-10% 100V CERM.
C10	4822 122 30045	27P +-2% 100V CERM.
C11	4822 122 30045	27P +-2% 100V CERM.
Resistors		
R1	5322 111 90431	9X10K 2% NETWORK
R4	5322 111 90431	1K5 10% 0,5W NTC

Unit 3B - Keyboard

Integrated Circuits		
V21	5322 209 10883	PCF8574P
V22	5322 209 10883	PCF8574P
Transistors		
Q21	4822 130 40959	BC547B
Capacitors		
C21	5322 121 42386	100N +-10% 63V FOIL
C22	5322 121 42386	100N +-10% 63V FOIL
Resistors		
R21	5322 111 90431	9X10K 2% NETWORK
R22	5322 111 90449	9X330R 2% NETWORK
Miscellaneous		
S1	5322 276 13433	PUSHBUTTON SWITCH
S2	5322 276 13433	PUSHBUTTON SWITCH
S3	5322 276 13433	PUSHBUTTON SWITCH
S4	5322 276 13433	PUSHBUTTON SWITCH
S5	5322 276 13433	PUSHBUTTON SWITCH
S6	5322 276 13558	PUSHBUTTON SWITCH
S8	5322 276 13561	PUSHBUTTON SWITCH
S9	5322 276 13559	PUSHBUTTON SWITCH
	4822 130 32472	LED 3MM GREEN TLG124
	5322 130 80121	LED 3MM YEL. TLY124
	4822 130 31274	LED 3MM RED. TLR124

Item	Ordering Number	Description

PM 8551/20 - RS232 Interface

Integrated Circuits		
V1	5322 209 12632	PCF84C00B
V2	5322 209 61496	SCC2692AC1N28
V3	5322 209 60094	MAX232
Transistors		
Q1	4822 130 40959	BC547B
Diodes		
D1-8	4822 130 30613	BAW62
Crystals		
X1	5322 242 71867	3,6864MHz
Capacitors		
C1	5322 121 42386	100N +-10% 63V FOIL
C2	5322 122 32163	5P6 +-P25 100V CERAM
C3	5322 122 32163	5P6 +-P25 100V CERAM
C4	5322 121 42114	1U0 +-5% 63V CERAMIC
C5	5322 124 11084	33U +-20% 10V ELCO
C6	4822 121 41857	10N +-10% 250V FOIL
C7	4822 121 41857	10N +-10% 250V FOIL
C8	4822 121 41857	10N +-10% 250V FOIL
C9	5322 121 42114	1U0 +-5% 63V FOIL
C10	5322 121 42114	1U0 +-5% 63V FOIL
C11	5322 121 42114	1U0 +-5% 63V FOIL

PM 8551/30 - IEEE Interface

Integrated Circuits		
V1	5322 209 12632	PCF84C00B
V2	5322 209 33673	74F06N
V3	5322 209 85407	74LS02N
V4	5322 209 10867	HEF40245BP
V5	5322 209 81807	SN75160BN-00
V6	5322 209 81842	SN75161AN-00
Diodes		
D1	4822 130 31983	BAT85
D2-8	4822 130 30613	BAW62
Crystals		
X1	4822 242 70392	6,0000MHz
Capacitors		
C1	5322 121 42386	100N +-10% 63V FOIL
C2	5322 122 32163	5P6 +-P25 100V CER.
C3	5322 122 32163	5P6 +-P25 100V CER.
C4	5322 124 11084	33U +-20% 10V ELCO
C5	5322 124 11084	33U +-20% 10V ELCO
C6	4822 121 41857	10N +-10% 250V FOIL
C7	4822 121 41857	10N +-10% 250V FOIL
C8	4822 121 41857	10N +-10% 250V FOIL

List of Standard Resistors

MR25 = 0.4W, 1%,
METAL FILM RESISTOR

Type	Value	Ordering number
MR25	10	5322 116 50452
MR25	11	5322 116 54059
MR25	12.1	5322 116 54069
MR25	13	5322 116 54082
MR25	15	5322 116 51221
MR25	16.2	5322 116 54431
MR25	18.2	5322 116 54083
MR25	20	5322 116 51048
MR25	22.1	5322 116 50983
MR25	24.3	5322 116 54435
MR25	26.7	5322 116 54067
MR25	30.1	5322 116 50904
MR25	33.2	5322 116 50527
MR25	35.7	5322 116 54439
MR25	39.2	5322 116 54087
MR25	43.2	5322 116 50519
MR25	47.5	5322 116 50952
MR25	51.1	5322 116 54442
MR25	56.2	5322 116 54446
MR25	61.9	5322 116 54451
MR25	68.1	5322 116 54455
MR25	75	5322 116 54459
MR25	82.5	5322 116 54462
MR25	90.9	5322 116 54466
MR25	100	5322 116 55549
MR25	110	5322 116 54474
MR25	130	5322 116 54481
MR25	150	5322 116 54486
MR25	162	5322 116 50417
MR25	182	5322 116 54493
MR25	200	5322 116 54496
MR25	221	4822 116 51223
MR25	267	5322 116 54503
MR25	301	5322 116 55366
MR25	332	4822 116 51226
MR25	357	5322 116 50603
MR25	392	5322 116 54006
MR25	432	5322 116 54522
MR25	475	5322 116 54007
MR25	511	4822 116 51282
MR25	562	4822 116 51231
MR25	619	4822 116 51232
MR25	681	4822 116 51233
MR25	750	4822 116 51234
MR25	825	5322 116 54541
MR25	909	5322 116 55278
MR25	1K	4822 116 51235
MR25	1.10K	4822 116 51236
MR25	1.21K	5322 116 54557
MR25	1.30K	5322 116 50526
MR25	1.50K	4822 116 51239
MR25	1.62K	5322 116 55359
MR25	1.82K	5322 116 54568
MR25	2K	5322 116 54572
MR25	2.21K	4822 116 51245
MR25	2.43K	5322 116 54004
MR25	2.67K	5322 116 54578
MR25	3.01K	4822 116 51246
MR25	3.32K	5322 116 54005
MR25	3.57K	5322 116 54586
MR25	3.92K	5322 116 54591
MR25	4.32K	5322 116 54594
MR25	4.75K	5322 116 54008
MR25	5.11K	5322 116 54595
MR25	5.62K	4822 116 51281
MR25	6.19K	5322 116 55426
MR25	6.81K	4822 116 51252
MR25	7.50K	5322 116 54608
MR25	8.25K	5322 116 54558
MR25	9.09K	4822 116 51284

Type	Value	Ordering number
MR25	10K	4822 116 51253
MR25	11K	5322 116 54623
MR25	12.1K	5322 116 50572
MR25	13K	5322 116 50522
MR25	15K	4822 116 51255
MR25	16.2K	5322 116 55361
MR25	18.2K	5322 116 54638
MR25	20K	5322 116 54642
MR25	22.1K	4822 116 51257
MR25	24.3K	5322 116 54647
MR25	26.7K	5322 116 54652
MR25	30.1K	5322 116 54655
MR25	33.2K	4822 116 51259
MR25	35.7K	5322 116 54662
MR25	39.2K	4822 116 51262
MR25	43.2K	5322 116 54667
MR25	47.5K	5322 116 54671
MR25	51.1K	5322 116 50672
MR25	56.2K	4822 116 51264
MR25	61.9K	5322 116 50872
MR25	68.1K	4822 116 51266
MR25	75K	4822 116 51267
MR25	82.5K	5322 116 55374
MR25	90.9K	5322 116 54694
MR25	100K	4822 116 51268
MR25	110K	5322 116 54701
MR25	121K	5322 116 54704
MR25	130K	5322 116 54707
MR25	150K	4822 116 51269
MR25	162K	5322 116 54716
MR25	182K	5322 116 54722
MR25	200K	4822 116 51286
MR25	221K	4822 116 51272
MR25	243K	5322 116 54733
MR25	267K	4822 116 54737
MR25	301K	5322 116 54743
MR25	332K	4822 116 51184
MR25	357K	5322 116 51767
MR25	392K	5322 116 51768
MR25	432K	5322 116 51769
MR25	475K	4822 116 51275
MR25	511K	5322 116 55258
MR25	562K	4822 116 51169
MR25	619K	5322 116 55315
MR25	681K	5322 116 55284
MR25	750K	5322 116 55532
MR25	825K	5322 116 51398
MR25	909K	5322 116 55533
MR25	1M	5322 116 55535

SMD resistors

Type 0805 = 1W, 0.5%,
CHIP

Type	Value	Ordering number
0805	2R2	4822 116 90466
0805	2R7	5322 116 82067
0805	3R3	4822 116 90469
0805	3R9	4822 116 82062
0805	4R7	4822 116 90462
0805	5R6	5322 116 82068
0805	6R8	5322 116 82069
0805	8R2	5322 116 82071
0805	10R	4822 116 90457
0805	12R	5322 116 82066
0805	15R	4822 116 81118
0805	18R	5322 116 81929
0805	22R	4822 116 90467
0805	27R	4822 116 90468
0805	33R	4822 116 90471
0805	39R	4822 111 91653
0805	47R	4822 111 91652
0805	56R	4822 116 90451
0805	68R	4822 116 80887
0805	82R	4822 111 91507
0805	100R	4822 116 90441
0805	120R	4822 116 81026
0805	150R	4822 116 80879
0805	180R	4822 116 90438
0805	220R	4822 116 90339
0805	270R	4822 116 80882
0805	330R	4822 111 91501
0805	390R	4822 116 81029
0805	470R	4822 116 90446
0805	560R	4822 111 91533
0805	680R	4822 116 90463
0805	820R	4822 116 81034
0805	1K0	4822 111 91516
0805	1K2	4822 116 80877
0805	1K5	4822 116 90458
0805	1K8	4822 116 81383
0805	2K2	4822 111 91522
0805	2K7	4822 111 91449
0805	3K3	4822 111 91526
0805	3K9	4822 111 91527
0805	4K7	4822 111 91532
0805	5K6	4822 111 91534
0805	6K8	4822 116 90464
0805	8K2	4822 111 91655
0805	10K	4822 111 91517
0805	12K	4822 116 81382
0805	15K	4822 111 91498
0805	18K	4822 111 91521
0805	22K	4822 111 91523
0805	27K	4822 116 90342
0805	33K	4822 116 81017
0805	39K	4822 116 90445
0805	47K	4822 111 91661
0805	56K	4822 111 91535
0805	68K	4822 116 90347
0805	82K	4822 116 81389
0805	100K	4822 111 91518
0805	120K	4822 116 90442
0805	150K	4822 116 90459
0805	180K	4822 116 90443
0805	220K	4822 116 80881
0805	270K	4822 116 81028
0805	330K	4822 116 90345
0805	390K	4822 111 91529
0805	470K	4822 116 90447
0805	560K	4822 116 80925
0805	680K	4822 116 81032
0805	820K	4822 116 90348

24. List of Recommended Spare Parts

Please observe that the recommended spare parts are split into "basic" and "supplement" packages.

The "basic" package contains the components common to all versions of PM 5655.

A "supplement" package contains the additional components needed to support a specific version of PM 5655.

The packages are to be ordered at your National Philips Sales Organization (we recommend that you purchase 1 package per 10 instruments in service).

Type	Ordering number
Basic kit	9449 818 56551
Suppl. kit for G version	9449 818 56553
Suppl. kit for M version	9449 818 56558

Basic kit

Quantity	Ordering number	Description
3	4822 253 50047	FUSE 0,5A
3	4822 253 50046	FUSE 1A
1	5322 130 91263	DISPLAY
1	5322 361 10726	FAN
1	5322 277 11337	MAINS SWITCH
1	5322 276 13559	PUSHBUTTON SWITCH
1	5322 276 13558	PUSHBUTTON SWITCH
1	5322 276 13561	PUSHBUTTON SWITCH
2	5322 276 13433	PUSHBUTTON SWITCH
1	5322 410 50176	SWITCH
1	5322 410 50174	SWITCH
1	5322 410 50175	SWITCH
1	4822 130 32472	LED 3MM GREEN TLG124
1	4822 130 31274	LED 3MM RED. TLR124
1	5322 130 80121	LED 3MM YEL. TLY124
1	5322 280 60469	12V DS4-E-M-DC
2	5322 124 40852	100U +-20% 35V ELCO
3	5322 124 80825	3300UF +-20% 40V ELCO
3	5322 124 10695	15U +-20% 16V TANTAL

Quantity	Ordering number	Description
5	5322 124 11084	33U +-20% 10V TANTAL
3	5322 124 10455	68U +-20% 6,3V TANTAL
3	5322 124 14081	6U8 +-20% 25V TANTAL
Integrated Circuits		
1	5322 209 12574	74ABT245N
1	5322 209 33685	74ACT0573P
1	5322 209 33685	74ACTQ573P
1	5322 209 12551	74ACTQ821
2	4822 209 62799	74F574N
1	5322 209 83218	74HC00N
2	5322 209 11337	74HC161N
2	5322 209 83271	74HC573N
3	5322 209 11342	74HC574N
1	5322 209 11473	74HC86N
1	5322 209 11323	74HCU04N
1	5322 209 73836	74LS86N
1	5322 209 52609	80C32
1	5322 130 83435	AD589JH
1	5322 209 63816	AD7537JN
2	5322 209 12569	AD811AN
2	4822 209 80525	CA3080E
1	5322 209 52592	CY7C132-30PC
1	5322 209 33679	DG611DJ
1	5322 209 33681	DG613DJ
1	5322 209 52593	DS80C320MCG
1	5322 209 12577	IDT74FCT377ATP
1	5322 209 33682	L296
2	5322 209 81395	LF353N
1	5322 209 85503	LM311N
1	5322 209 82943	LM317LZ
1	4822 209 80591	LM317T
1	5322 209 83228	LM337LZ
1	5322 209 81236	LM337T
2	5322 209 80903	LM78L05ACZ
1	5322 209 12576	LMC662CN
1	5322 209 32559	LT1070CT
1	5322 209 62691	LT1086CT
1	5322 209 12535	MAX693ACPE
1	5322 209 52594	MK48Z08B-10
1	5322 209 33683	PCA8510P/003
1	4822 209 62476	PCB80C31BH
2	5322 209 10883	PCF8574P
1	5322 209 51263	PCF8582AP
1	5322 209 11738	PCF8591P

Quantity	Ordering number	Description
Transistors		
2	5322 130 44609	2N3209
2	5322 130 44476	BC264A
3	4822 130 40959	BC547B
3	4822 130 44568	BC557B
2	4822 130 44154	BF199
3	4822 130 44237	BF450
1	5322 130 44418	BF256A
3	5322 130 42405	BSD214
3	4822 130 41594	PH2369
Diodes		
1	5322 130 30742	1N825A
3	4822 130 31983	BAT85
4	4822 130 30613	BAW62
2	5322 130 31684	BB809
2	5322 130 80285	SB360
Crystals		
1	4822 242 70362	5,000000MHz
1	4822 242 71663	12,000000MHz
1	5322 466 91019	24,000MHz

Suppl. kit for G version

Crystal		
1	5322 242 81808	OCXO 17,734375MHz

Suppl. kit for M version

Integrated Circuits		
1	5322 209 12547	EL2030CN
1	5322 209 52868	M48Z32-85PC1
1	5322 209 63002	TDC1012N7C1
Crystal		
1	5322 242 82254	OCXO 14,318180MHz

APPENDICES

Appendix A - Tables

A.1 Test Signals and Test Patterns

Name of Testsignal or Pattern	Description / Remarks	Full Field & Substitution		VITS Line
		TTL (4)	IEEE-488 & RS232 (5)	
		Signal no.:	Group Pattern	Line Type no.:
ERASE	Erases incoming line	-	-	1
PASS	Incoming line is passed through	-	-	2
EXTERNAL1, Std	Inserts VITS from EXT1 (2, 3)	-	-	3
EXTERNAL2, Std	Inserts VITS from EXT2 (1, 3)	-	-	4
EXTERNAL3, Std	Inserts VITS from EXT3 (1, 3)	-	-	5
EXTERNAL4, Std	Inserts VITS from EXT4 (2, 3)	-	-	6
EXTERNAL1, Wide	Inserts VITS from EXT1 (2, 3)			53
EXTERNAL2, Wide	Inserts VITS from EXT2 (1, 3)			54
EXTERNAL3, Wide	Inserts VITS from EXT3 (1, 3)			55
EXTERNAL4, Wide	Inserts VITS from EXT4 (2, 3)			56
EXT1/EXT4	External substitution signal (2)	-	1,29	-
NTC7 Composite		12	1,1	8
NTC7 Combination		13	1,2	9
FCC Composite		14	1,3	10
FCC Multiburst		15	1,4	11
VIRS		16	1,5	12
FCC Color bar		17	1,6	13
Color bar 75%	7 bars (no black) for EIA bars	18	1,7	14
Red 75%		19	1,8	15
SinX/X 100%		20	1,9	16
SinX/X 70%		21	1,10	17
Multiburst 100%		22	1,11	18
Multiburst 60%		23	1,12	19
Linesweep 5MHz		24	1,13	20
Ramp Modulated		25	1,14	21
Ramp Luminance		26	1,15	22
Staircase Mod		27	1,16	23
Staircase Lum.		28	1,17	24
Pulse & Bar	12.5T + 2T + Bar with inv. 2T	29	1,18	25
Multipulse 100%		30	1,19	26
Multipulse 70%		31	1,20	27
Black 0 IRE		0	1,21	28
Black 7.5 IRE		1	1,22	29
Black 10 IRE		2	1,23	30
Grey 50 IRE		3	1,24	31
White 90 IRE		4	1,25	32
White 100 IRE		5	1,26	33
2T Refl. Pulse		6	1,27	34
Sq. wave 250kHz		7	1,28	35
Eyetest Line 1	(1)	8	1,30	36
Eyetest Line 2	(1)	9	1,31	37
Sound Stereo	One pulse at 29µs (1)	10	1,32	38

Name of Testsignal or Pattern	Description / Remarks	Full Field & Substitution		VITS Line
		TTL (4)	IEEE-488 & RS232 (5)	
		Signal no.:	Group Pattern	Line Type no.:
Sound Dual	Pulse at 22µs and 46µs (1)	11	1,33	39
Ghost Philips	(1)	-	-	61
Ghost BTA	(1)	-	-	62
Ghost Korea	(1)	-	-	63
Source ID Codes				
TEK ID Code 1	1100 0000 0000 0001 (lsb to msb) (1)	-	-	40
TEK ID Code 2	1110 0000 0000 0001 (1)	-	-	41
TEK ID Code 3	1111 0000 0000 0001 (1)	-	-	42
TEK ID Code 4	1111 1000 0000 0001 (1)	-	-	43
TEK ID Code 5	1111 1100 0000 0001 (1)	-	-	44
TEK ID Code 6	1111 1110 0000 0001 (1)	-	-	45
TEK ID Code 7	1111 1111 0000 0001 (1)	-	-	46
TEK ID Code 8	1111 1111 1000 0001 (1)	-	-	47
TEK ID Code 9	1111 1111 1100 0001 (1)	-	-	48
TEK ID Code 10	1111 1111 1110 0001 (1)	-	-	49
Test Patterns				
PHILIPS 4:3		32	2,1	-
PHILIPS 16:9		33	2,2	-
SMPTE bar		34	2,3	-
EIA bar		35	2,4	-
Bars over Red	75% bars	36	2,5	-
TTS Pattern	Transmitter Test Signal	37	2,6	-
Matrix	(1)	38	2,7	-
Eyetest Pattern	(1)	39	2,8	-
60Hz	(1)	40	2,9	-
AC Bounce	(1)	41	1,29	-

BNotes to the survey:

- : Function not available.

(1) : Signal cannot be used for substitution.

(2) : EXT1 is default input for external substitution, but hardware configuration for EXT4.

(3) : Std = Standard insertion interval (9.2-62.16µs)

Wide = Wide insertion interval (8.8-62.56µs)

(4) : Decimal value of the binary selection of signals via TTL-control (*refer to paragraph 6.3*).

(5) : Different headers preceeds the "group, data" (*refer to IEEE-488/RS3232 commands, paragraph 8.4*).

A.2 Character Set

Code	Character
32	(Sp)
33	!
36	$
37	%
38	&
39	'
40	(
41	)
43	+
44	,
45	-
46	.
48	0
49	1
50	2
51	3
52	4
53	5
54	6
55	7
56	8
57	9
58	:
61	=
63	?
65	A
66	B
67	C
68	D

Code	Character
69	E
70	F
71	G
72	H
73	I
74	J
75	K
76	L
77	M
78	N
79	O
80	P
81	Q
82	R
83	S
84	T
85	U
86	V
87	W
88	X
89	Y
90	Z
95	_
97	a
98	b
99	c
100	d
101	e
102	f

Code	Character
103	g
104	h
105	i
106	j
107	k
108	l
109	m
110	n
111	o
112	p
113	q
114	r
115	s
116	t
117	u
118	v
119	w
120	x
121	y
122	z
128	Ç
129	ü
153	Ö
154	Ü
253	Empty Space

Note: Empty Space is used to delay the horizontal start of the text fields.

A.3 Error Codes During Power Up Sequence

Error Message in Display	Error Cause
E(01) Memory/Back-up error	Generator memory back-up not valid.
E(02) Communication error	Generator µP not responding
E(04) Communication error	Sync µP not responding
E(08) Communication error	Master memory back-up not valid.
E(10) Communication error	Master µP, local IIC communication crashed
E(20) Communication error	Front plate memory back-up not valid
E(40) Communication error	Front plate, local IIC communication crashed.
E(80) Communication error	Seriel communication between front plate and master-µP crashed.

SERVICE INFORMATION